CENTRAL LIBRARY

UNIVERSITY OF CALCUTTA REGISTRARS OFFICE

THE JOURNAL

OF THE

ASIATIC SOCIETY

OF

BENGAL.

(055.1 052.)

EDITED BY

THE ACTING SECRETARIES.

2512

VOL. VIII.

JANUARY TO DECEMBER, 1839.

"It will flourish, if naturalists, chemists, antiquaries, philologers, and men of science, in different parts of *Asia* will commit their observations to writing, and send them to the Asiatic Society in Calcutta; it will languish, if such communications shall be long intermitted; and will die away, if they shall entirely cease."—Sir Wm. Jones.

CALCUTTA:

Bishop's College Press.

1840.

Contents.

No. 85.—JANUARY.

Page.

Prefatory Notice, ... i

I.—A Grammar of the Pashtoo or Afghanee Language. By Lieut. Leach, ... 1

II.—Sisupala Badha, or death of Sisupala by Mágha. Translated, with Annotations, by J. C. C. Sutherland, Esq. 16

III.—On the Distribution of European Birds. By W. Jameson, Esq., Bengal Medical Service, ... 21

IV.—On a new Genus of the Fissirostral Tribe. By B. H. Hodgson, Esq., Catamandu (*with plate*). 35

V.—Two new species of Meruline Birds. By B. H. Hodgson, Esq., Catamandu (*with plate*), ... 37

VI.—On the Egyptian system of Artificial Hatching. By Don Sinbaldo Demas (*with plate*), ... 38

VII.—Dr. Burke's Report on the Value of Life among the Officers and Men in H. Majesty's troops in India, ... 48

VIII.—Observations on the Burmese and Munipoor Varnish Tree. By N. Wallich, Esq. M.D. (*with plate*), ... 70

IX.—Proceedings of the Asiatic Society, ... 72

X.—Meteorological Register, ... 76

No. 86.—FEBRUARY.

I.—Report on the Settlement of the ceded District of Azimgurh, commonly called Chuklah Azimgurh. By J. Thomason, Esq. 77

II.—Mr. Hodgson on Cuculus. 136

III.—Report on the Coal and Iron Mines of Tálcheer and Ungool, &c. &c. By Mr. M. Kittoe, ... 137

IV.—Objects of Research in Affghanistan. By Professor Lassen, ... 145

V.—On the detection of Arsenical Poisons, &c. &c. By W. B. O'Shaughnessy, Esq. M.D. 147

VI.—Proceedings of the Asiatic Society. 150

VII.—Meteorological Register, ... 158

No. 87.—MARCH.

I.—Notice of an Inscription on a Slab discovered in February, 1838, by Capt. T. S. Burt, Bengal Engineers, in Bundelkhund, near Chhatarpur, ... 159

II.—Account of a Journey to Beylah, and Memoir on the Province of Lus. By Lieut. Carloss, Indian Navy, ... 184

III.—On three new species of Musk (*Moschus*) inhabiting the Himalayan districts. By B. H. Hodgson, Esq. 202

IV.—On Isinglass in *Polynemus sele*, Buch., a species which is very common in the Estuaries of the Ganges. By J. M'Clelland, Assistant Surgeon, (*with plate,*) 203

Page.

V.—Journal of the Mission which visited Bootan, in 1837-38, under Captain R. Boileau Pemberton. By W. Griffith, Esq., Madras Medical Establishment, (*with map,*) 208
VI.—Report on the Museum of the Asiatic Society. By Dr. Wm. Jameson, .. 241
VII.—Proceedings of the Asiatic Society, ... 245
VIII.—Meteorological Register, ... 250

No. 88.—APRIL.

I.—Journal of the Mission which visited Bootan, in 1837-38, under Captain R. Boileau Pemberton. By W. Griffith, Esq. Madras Medical Establishment. (*concluded*) 251
II.—Account of Tamba Patra Plates dug up at Baroda, in Goojrat; with Facsimile and Translation. 292
III.—Collection of Facts which may be useful for the comprehension of Alexander the Great's exploits on the Western Banks of the Indus (*with map.*) 304
IV.—Remarks upon the Rain and Drought of the last Eight Seasons in India. By the Rev. R. Everest, Landour. 313
V.—Statistical Record of the duration of diseases in 13,019 fatal cases in Hindoos.—Extraordinary mortality among Lying-in Women—Compiled by Dr. Duncan Stewart, Superintendent General of Vaccination. 316
VI.—Summary description of four new species of Otter. By B. H. Hodgson, Esq. Resident at Catamandu, Nepal. 319
VII.—On the Geographic Distribution of the Vulturidæ, Falconidæ, and Strigidæ; being the first of a series of memoirs intended to illustrate the Geographic Distribution of the Ornithological Kingdom. By Wm. Jameson, Esq., Assistant Surgeon Bengal Medical Service, &c. 321
VIII.—On the use of Wells, &c. in Foundations; as practised by the natives of the Northern Doab. By Capt. Cautley, Superintendent of the Doab Canal. 327
IX.—Proceedings of the Asiatic Society. 341
X.—Meteorological Register, ... 346

No. 89.—MAY.

I.—Notice of Inscriptions in Behar, communicated by Mr. Ravenshaw. 347
II.—The "Mahimnastava," or a Hymn to Shiva; with an English translation. By the Rev. Krishna Mohana Banerji..... 355
III.—Account of a Journey from Calcutta viâ Cuttack and Pooree to Sumbulpúr, and from thence to Mednipúr through the Forests of Orissa. By Lieut. M. Kittoe. (*continued*) 367
IV.—Proposed publication of Plates of Hindu Architectural Remains 384
V.—Papers relative to the New Coal Field of Tenasserim. 385
VI.—Memoir on the Regeneration and actual state of Medicine in Egypt.—Translated from the Italian of J. E. Mino, Doctor in Philosophy, Medicine, and Surgery. Leghorn, 1838. 389
VII.—Note on the dissection of the Arctonix Collaris, or Sand Hog. By George Evans, Esq. late Curator to the Asiatic Society. 408
VIII.—On the Cultivation of Roses and the Manufacture of Rose-Water and Uttur at Ghazeepore. 411
IX.—Memoranda on the Museum of the Asiatic Society. By Dr. M'Clelland. 415
X.—Observations on the "Report on the Museum of the Asiatic Society, by Dr. Wm. Jameson," published in the Journal for March, 1839. By J. T. Pearson, Asistant Surgeon, formerly Curator of the Museum of the Asiatic Society. 419

	Page.
XI.—Proceedings of the Asiatic Society for May, ...	429
XII.—Proceedings of the Asiatic Society for June, ...	432
XIII.—Proceedings of the Asiatic Society for July, ...	433
XIV.—Meteorological Register for May,....	442
XV.—Ditto ditto for June, ...	644
XVI.—Ditto ditto for July, ...	444

No. 90.—JUNE.

I.—Extracts from the Narrative of an expedition into the Naga territory of Assam. By E. R. Grange, Esq. Sub-Assistant to the Commissioner, Assam,..	445
II.—Report by Lieut. John Glasfurd, Executive Engineer, Kumaon division, on the progress made up to the 1st May, 1839, in opening the experimental Copper Mine in Kumaon, ...	471
III.—Account of a Journey from Calcutta viâ Cuttack and Pooree to Sumbulpúr, and from thence to Mednipúr through the Forests of Orissa. By Lieut. M. Kittoe. *(continued)*	474
IV.—Notice of a Grant engraved on Copper, found at Kumbhi, in the Saugor Territory, ...	481
V.—Mr. Middleton on the Meteors of August 10th, 1839.	495
VI.—Note to the Editors on the Native mode of preparing the perfumed Oils of Jasmine and Bela. By Dr. Jackson, Ghazeepore.	496
VII.—Report on the Manufacture of Tea, and on the extent and produce of the Tea Plantations in Assam. By C. A. Bruce, Esq. Superintendent of Tea Culture.	497
VIII.—Proceedings of the Asiatic Society, ...	526

No. 91.—JULY.

I.—Specimen of the Burmese Drama, translated by J. Smith, Esq., communicated by C. A. Blundell, Esq., Commissioner, &c., Moulmein.....	535
II.—On the Bora Chung, or the Ground Fish of Bootan. By J. T. Pearson, Esq.	551
III.—Extracts from official records, with descriptive details regarding the New Nizamut Palace of Moorshedabad—erected by Colonel D. M'Leod, Chief Engineer of Bengal.	552
IV.—Researches on the Gale and Hurricane in the Bay of Bengal on the 3rd, 4th, and 5th of June, 1839; being a First Memoir with reference to the Theory of the Law of Storms in India. By Henry Piddington, Esq.	559
V.—Note on the "Trochilus and Crocodile" of Herodotus. By W. C. Hurry, Esq.	590
VI.—Documents relative to the application of Camel Draught to Carriages; communicated by C. B. Greenlaw, Esq., Secretary to the Bengal Steam Committee.	591
VII.—Account of a Journey from Calcutta viâ Cuttack and Pooree to Sumbulpúr, and from thence to Mednipúr through the Forests of Orissa. By Lieut. M. Kittoe. *(continued)*	606
VIII.—Meteorological Register, ...	621

No. 92.—AUGUST.

I.—Note on the Mechis, together with a small Vocabulary of the Language. By A. Campbell, Esq. Assistant to the Resident at Nipal, in charge of Darjeeling.	623

Page.

II.—Researches on the Gale and Hurricane in the Bay of Bengal on the 3rd, 4th, and 5th of June, 1839; with reference to the Theory of the Law of Storms in India. By Henry Piddington, Esq. 631

III.—Extracts from Mr. M'Clelland's paper on Indian Cyprinidæ. As. Res. Vol. XIX. Part II. 650

IV.—Account of a Journey from Calcutta via Cuttack and Pooree to Sumbulpúr, and from thence to Mednipúr through the Forests of Orissa. By Lieut. M. Kittoe. *(continued)* 671

V.—Note on a pillar found in the Ganges near Pubna, and of another at Kurra, near Allahabad. By Lieut. M. Kittoe. 681

VI.—Note by Messrs. Jessop & Co. of Calcutta, on the smelting of the Iron Ore of the district of Burdwan. 683

VII —Note on the habits of the Coel, and on the discovery of Isinglass. By Major Davidson. 684

VIII.—Note on the Scapes of Xanthorhæa and Fossil Stems of Lapidodendra. By Lieut. N. Vicary. 686

IX.—Proceedings of the Asiatic Society. 687

X.—Meteorological Register, ... 692

No. 93.—SEPTEMBER.

I.—Sanscrit Inscription on the Slab removed from above the Kothoutya gate of the Fort Rohtas. By the Editors. 693

II.—On Camel Litters for the Wounded. By H. Piddington, Esq. 702

III.—Note by Dr. Kean of Moorshedabad, on Dr. Stewart's Table of Mortality among Hindu Females. 704

IV.—On fifteen varieties of Fossil Shells found in the Saugor and Nerbudda territories. By George G. Spilsbury, Esq. Surgeon, &c. 708

V.—Note on the River Goomtee, with a section of its bed. By V. Tregear, Esq. Jounpore. 712

VI.—Memoranda relative to experiments on the communication of Telegraph Signals by induced Electricity. By W. B. O'Shaughnessy, Esq. M.D. Assistant Surgeon; Professor of Chemistry, Medical College, Calcutta; and Officiating Joint-Secretary to the Asiatic Society of Bengal. 714

VII.—Extract from a Memoir on the Preparations of the Indian Hemp, or Gunjah, (*Cannabis Indica*) their effects on the Animal system in Health, and their utility in the Treatment of Tetanus and other Convulsive Diseases. By W. B. O'Shaughnessy, Esq. M.D. Professor in the Medical College of Calcutta, &c. &c. 732

VIII.—Memoir on the Climate, Soil, Produce, and Husbandry of Afghanistan and the Neighbouring Countries. By Lieut. Irwin. 745

IX.—Meteorological Register, ... 777

No. 94.—OCTOBER.

I.—Memoir on the Climate, Soil, Produce, and Husbandry of Afghanistan and the Neighbouring Countries. By Lieut. Irwin, *(continued)* 779

II.—March between Mhow and Saugor, 1839. 805

III.—On an Aerolite presented to the Society. 822

IV.—Extracts from the Mohit (the Ocean,) a Turkish work on Navigation in the Indian Seas. Translated and communicated by Joseph Von Hammer, Baron Purgestall, Aulic Counsellor, and Professor of Oriental Languages at Vienna, &c. &c. 823

Page.

V.—Description of an Astronomical Instrument presented by Rajah Ram Sing, of Khota, to the Government of India. By J. J. Middleton, Esq. of the Hindoo College, Calcutta. 831

VI.—Extract from a Memoir on the preparations of the Indian Hemp, or Gunjab, *(Cannabis Indica)* their effects on the Animal system in Health, and their utility in the Treatment of Tetanus and other Convulsive Diseases. By W. B. O'Shaughnessy, Esq. M.D. Professor in the Medical College of Calcutta, &c. &c. *(concluded)* 838

VII.—Memorandum on the Explosion of Gunpowder under Water by the Galvanic Battery; with a notice of the successful destruction of the "Equitable" at Fultah Reach. By W. B. O'Shaughnessy, Esq. M.D. Assistant Surgeon, &c. &c. 851

VIII.—Proceedings of the Asiatic Society, ... 863

Notices, ... 866

IX.—Meteorological Register, ... 867

No. 95.—NOVEMBER.

I.—Memoir on the Climate, Soil, Produce, and Husbandry of Afghanistan and the Neighbouring Countries. By Lieut. Irwin, *(continued)* 869

II.—Journal of a trip through Kanawur, Hungrung, and Spiti, undertaken in the year 1838, under the patronage of the Asiatic Society of Bengal, for the purpose of determining the geological formation of those districts.—By Lieut. Thomas Hutton, 37th Regt. N. I., Assistant Surveyor to the Agra Division. 901

III.—Notes on various Fossil Sites on the Nurbudda; illustrated by specimens and drawings. 950

IV.—Proceedings of the Asiatic Society. 953

V.—Meteorological Register, ... 971

No. 96.—DECEMBER.

I.—Third Report on Tenasserim—the surrounding Nations,—Inhabitants, Natives and Foreigners—Character, Morals and Religion.—By John William Helfer, M.D. 973

II.—Memoir on the Climate, Soil, Produce, and Husbandry of Afghanistan and the Neighbouring Countries. By Lieut. Irwin, *(continued)* 1005

III.—Journal of a Mission from the Supreme Government of India to the Court of Siam, ... 1016

IV.—Remarks on the Geology, &c. of the country extending between Bhar and Simla. 1037

V.—Note on the process of washing for the gold dust and diamonds at Heera Koond. By J. R. Ouseley, Esq. 1057

VI.—Proceedings of the Asiatic Society, ... 1059

VII.—Meteorological Register, ... 1069

JOURNAL

OF

THE ASIATIC SOCIETY.

No. 85.—JANUARY, 1839.

ART. I.—*A Grammar of the Pashtoo, or Afghánee Language. By* LIEUT. R. LEACH, *Bombay Engineers, Assistant on a Mission.*

To the Secretary to the Asiatic Society.

Political Dept.

SIR,—I am directed by the Honorable the President in Council to forward to you the accompanying Grammar of the Pashtoo or Afghán Language, compiled by Lieutenant Leach, for such notice as the Society may deem it to merit.

2. I am further directed to request that the Grammar in question may be returned when no longer required.

I have the honor to be,
Sir,
Your most obedient humble servant,
H. T. PRINSEP,
Secy. to the Govt. of India.

Fort William, 20th Feb. 1839.

This language is called Afghánee or Avghánee by Persians and other foreigners, and Pashtoo, Pukhtoo, and Pestoo, severally, by the Afghán's of Candhar, Peshawar, Teerai, and by the Afreedees, Khybeerees, &c. &c.

The language is decidedly of Sanscrit complexion, from the frequent occurrence of the ष *jh* and च *kgh*; indeed these two letters with the Devnagary ड compose the peculiarity of the language.

The difference between the Peshawar and Candhar dialect is, that in the former the Persian خ is used, when in the latter the Sanscrit ष occurs.

The Candharee is reckoned the purest dialect ; and when correctly spoken, resembles in the plaintiveness of its tones the peculiar dialect of Ireland.

The Alphabet is as follows.

Afghánee.	*Devnagary.*	*English.*	*Pronunciation.*
ا ...	अ ...	a ...	as the second *a* in parable,
ب ...	ब ...	b ...	as the English,
پ ...	प ...	p ...	Ditto, ditto,
ت ...	त ...	t ...	as the Continental *t*,
ټ ...	...	*th* ...	as *th* in things,
ټ ...	ट ...	t ...	as the English *t*,
ج ...	ज ...	j ...	as the English *j*,
چ ...	च ...	ch ...	as the English,
ح ...	...	h ...	as the aspirated *h*,
خ ...	...	*kh* ...	as *ch* in the Scotch loch,
ځ ...	...	z ...	the Afghân *z* used for coupling,
د ...	द ...	d ...	the Continental *d*,
ذ ...	...	*th* ...	as *th* in those
ډ ...	ड ...	d ...	the harsh English *d*,
ر ...	र ...	r ...	the English *r*,
ړ ...	ड़ ...	d ...	the peculiar Marathà *d*,
ز ...	...	z ...	the English *z*,
ژ ...	...	j ...	the French *j* in jour,
س ...	स ...	s ...	the English *s*,
ش ...	श ...	sh ...	the English *sh*,
ښ ...	ष ...	jh ...	unknown in English,
ص ...	...	s ...	the Arabic dwàd,
ض ...	...	dz ...	the Arabic dzwàd,
ط ...	...	t ...	the Arabic *t*,

The Alphabet (Continued.)

Afghánee.	*Devna-gary.*	*English.*	*Pronunciation.*
ظ ...	...	z	... the Arabic *z*,
ع ...	...	ʻx	... the Arabic mark for guttural vowels,
غ ...	...	*gh*	... the Persian guttural,
ف ...	फ ...	f	... the English *f*,
ق ...	...	k	... the harsh English *k*,
ک ...	क ...	k	... the English *k*,
گ ...	ग ...	g	... the English *g*,
ل ...	ल ...	l	... the English *l*,
م ...	म ...	m	... the English *m*,
ن ...	न ...	n	... the English *n*,
و ...	व ...	w	... the English *w*, or *v*,
ه ...	ह ...	h	... the English *h*,
ي ...	य ...	y	... the English *y*,
س ...	क्ष ...	kgh	... the Sanscrit.

The same story is told of the Af*ghán* language, that the Mahrattas tell of the Canarese, viz., That a certain king sent his vizier to collect all the vocabularies and dialects of the earth; on the vizier's return he proceeded to quote specimens before his royal Master: when he came to speak of the Af*ghánee* dialect, he stopped, and producing a tin pot containing a stone, began to rattle it. The king in surprise asked the meaning of this proceeding. The vizier said that he had failed to get a knowledge of the Af*ghánee* language, and could only describe it by rattling a stone in a tin pot.

It is also said, that Mahammad, the Arabian prophet, gave it as his opinion that the Af*ghánee* was to be the language of the infernal regions, as Arabic was to be that of heaven.

In the comparison of languages, in which Arabic is called science, *(ilm)*; Turkish *accomplishment, (hunar)*; Persian *sugar*; Hindustanee *salt*; the Af*ghán* is complimented with the appellation of the "braying of an ass."

An *Afghán* is immediately discovered by another by the correctness with which he distinguishes between a masculine and feminine noun.

Declension of a Noun Masculine.

	Singular.	*Plural.*
Nominative	ás, a horse	asán, horses
Genitive	da ás, of a horse	da asáno, of horses
Accusative & Dative	ás ta, a horse	asánoo ta, horses
Ablative	la ás, from a horse	la asánoo, from horses

Declension of a Noun Feminine, ending in a Vowel.

	Singular.	*Plural.*
Nominative	aspá, a mare	aspe, mares
Genitive	dá aspá, of a mare	da aspo, of mares
Accusative & Dative	aspeta, a mare	aspota, mares
Ablative	la aspe, from a mare	la aspo, from mares

Examples of forming the Feminine from the Masculine Noun.

Masculine.	*Feminine.*
spe, dog	spai, a bitch
*kh*ar, a donkey	*kh*ara, a she-ass
buz, a he-goat	buza, a she-goat
gid, a fat-tailed ram	gida, a female sheep
orárá, nephew	orerá, niece
tara, uncle	tarala, aunt

Declension of a Compound Noun.

	Singular.	*Plural.*
Nominative	*gh*a sadai, a good man	*gh*a sadee, good men
Genitive	da *gh*a sade, of a good man	da *gh*a sadee, of good men
Acc. & Dat.	*gh*a sade ta, a good man	*gh*a sadota, good men
Ablative	la *gh*asade, from a good man	la *gh*a-sadee, from good men

Declension of the 1st Personal Pronoun.

Nom.	za, I	muj, we
Gen.	zmá, mine.	zmuj, ours
Acc. & Dat.	málá, me.	mujla, us
Abl.	la má, from me.	la muj, from us

Declension of the 2nd Personal Pronoun.

	Singular.		*Plural.*	
Nom.	ta,	thou	táso,	ye
Gen.	stá,	thy	istáso,	yours
Acc. & Dat.	tálá,	thee	tásolá,	you
Abl.	la tá,	from thee	la taso,	from you

Declension of the 3d Personal Pronoun—proximate.

Nom.	da*ghá*,	this	dagho,	these
Gen.	da de,	these	da deev,	of these
Acc. & Dat.	dela,	this	deevla,	these
Abl.	la de,	from this	la deev,	from these

Declension of the 3rd Personal Pronoun—remote.

Nom.	ha*ghá*,	that	ha*gho*,	those
Gen.	da ha*ghá*,	of that	da ha*gho*,	of those
Acc. & Dat.	ha*ghá* ta,	that	ha*gho* ta,	those
Abl.	la ha*ghá*,	from that	la ha*gho*,	from those

Declension of the Reflective Pronoun.

Nom.	Pa*kh*pul,	I myself
Gen.	A*kh*pul,	my own
Acc. & Dat.	... ...	wanting
Abl.	... ...	ditto

Declension of the Interrogative Pronoun—animate.

	Singular.	
Nom.	sok,	who
Gen.	da chá,	whose
Acc. & Dat.	chá ta,	who
Abl.	la chá,	from whom

Declension of the Interrogative Pronoun—inanimate.

Nom.	sa,	what
Gen.	a sa,	of what
Acc. & Dat.	sa la,	why
Abl.	la sa,	from what

Cardinal Numbers.

1	you	11	you las
2	dwá	12	dwá las
3	dare	13	dyar las
4	salor	14	swár las
5	pinz	15	pinz las
6	shpaj	16	shpadas
7	avo	17	olas
8	atha	18	athlas
9	nah	19	nolas
10	las	20	shil
21	you visht	31	you dergh
22	do visht	32	do dergh
23	dre visht	33	dre dergh
24	salerisht	34	salor dergh
25	pinzvisht	35	pinz dergh
26	shpaj visht	36	shpaj dergh
27	ovisht	37	o,o dergh
28	athvisht	38	ath dergh
29	novisht	39	nah dergh
30	dergh	40	salweght
41	you salweght	51	you pinzost
42	doo salweght	52	doo pinzost
43	dre salweght	53	dre pinzost
44	salor salweght	54	salor pinzost
45	pinz salweght	55	pinz pinzost
46	shpaj salweght	56	shpaj pinzost
47	o,o salweght	57	o,o pinzost
48	ath salweght	58	ath pinzost
49	nah salweght	59	nah pinzost
50	pinzast	60	shpeta
61	you shpeta	71	you avyà
62	doo shpeta	72	doo avyà
63	dre shpeta	73	dre avyà
64	salor shpeta	74	salor avyà
65	pinz shpeta	75	pinz avyà
66	shpaj shpeta	76	shpaj avyà
67	o,o shpeta	77	o,o avyà
68	ath shpeta	78	ath avyà
69	nah shpeta	79	nah avyà
70	avyà	80	atyà

81	you atyá	91	you nawee
82	doo atyá	92	doo nawee
83	dre atyá	93	dre nawee
84	salor atyá	94	salor nawee
85	pinz atyá	95	pinz nawee
86	shpaj̄ atyá	96	shpaj̄ nawee
87	oowa atyá	97	oova nawee
88	ath atyá	98	ath nawee
89	nah atyá	99	nah nawee
90	nawee	100	sil
1000	zil	1,00,000	lakh

kror 1,00,00,000

Ordinal Numbers.

1st	yawam	6th	shpaj̄am
2nd	doowam	7th	owam
3rd	dreyam	8th	atham
4th	salaram	9th	naham
5th	pinzam	10th	lasam, &c.

Conjugation of the Auxiliary Verb (masculine.)

Indicative Mood.

Present Tense.

	Singular.	*Plural.*
1st Person,	zaiyam, I am	muj̄ yoo, we are
2nd	taiye, thou art	táseyást, you are
3rd	hagha, dai, he is	haghádee, they are

Perfect Past Tense.

	Singular.	*Plural.*
1st Person,	zawum, I was	muj̄ woo, we were
2nd do	ta we, thou wast	tási wást, you were
3rd do	haghá woo, he was	haghá woo, they were

Imperfect Past Tense.

	Singular.	*Plural.*
1st Person,	za kedam, I was being	muj̄ kedoo,
2nd do	ta kede	tási kedást,
3rd do	haghá keda	haghá keda,

Pluperfect Past Tense—HAD BEEN.

1st Person	za sawai wam	muj̄ siwee woo
2nd do	ta suwai wee	tasi siwee wást
3rd do	haghá sawai woo	hagha siwee woo

Future Tense—SHALL BE.

1st Person,	zakeajam	muj keajam
2nd do	ta keaja	tási keajai
3rd do	hagha keajee	hagho keajee

Imperative Mood.

ta sa, be thou — tasi sai, be you.

Subjunctive Mood.

Present Tense.—MAY BE.

1st Person,	zawam	muj woo
2nd do	ta we	tasi wást
3rd do	hagha see	hagho soo

The Relative Conjugation IF *is expressed by* KA.

Perfect Past Tense.

1st Person,	za wai	muj wai
2nd	ta wai	tási wai
3rd	hagha wai	hagho wai

Infinitive Mood KEDA, "BEING," OR "TO BE."

Past Participle, SAWAI WOO, "BEEN."

Conjugation of the Verb WAIYIL, "*to speak.*"

Present Tense.

	Singular.	*Plural.*
1st Person,	za waiyam	muj waiyoo
2nd do	ta wai	tasi waiya'st
3rd do	hagha wai	hagho wai

The feminine gender only changes the 1st Person Singular, as a woman says, *za waiyama.*

Perfect Past Tense.

1st Person,	ma' waiyil	muj waiyil
2nd do	ta' waiyil	ta'si waiyil
3rd do	hagha' waiyil	hagho waiyal

Imperfect Past Tense.

1st Person,	ma' waiyil	muj waiyil
2nd do	ta' waiyil	ta'si waiyil
3rd do	hagha' waiyil	hagho waiyil

Pluperfect Past Tense.

1st Person,	má waiyalaiwo	muj waiyaleewoo
2nd do.	tá wo waiyil	tási waiyaleewoo
3rd do.	ha*ghá* waiyalaiwo	ha*gho* waiyalai woo

Future Tense.

	Singular.	*Plural.*
1st Person,	za bawowaiyam	muj bawowáyoo
2nd ditto	ta bawowaiye	tási bawowaiyast
3rd ditto	ha*ghá* bawowai	ha*gho* bawowai

Imperative Mood.

ta wawáya	tási wowáyást

Subjunctive Mood.

Present Tense.

1st	za wowáyam	muj wowáyoo
2nd	ta wowáye	tasi wowáyást
3rd	ha*ghá* wowáyee	ha*gho* wowáyee

Perfect Past Tense.

1st	ma waiyalaiwoo	muj waiyaleewoo
2nd	tá waiyalaiwoo	tási waiyaleewoo
3rd	ha*ghá* waiyalaiwoo	ha*gho* waiyaleewoo

Adverbs, Post- and Pre- positions, Conjunctions, &c. &c.

porta, above	sarangá, how
k*gh*ata, below	bul jalá, again
danana, in	os, now
dabándee, out	biyá, afterwards
dilta, here	ma*kh* á mu*kh*, in front
halta, there	bas, enough
de khawa, on this side	ham, also
ha*ghá kh*awá, on that side	ho, yes
doudande, before	nah, no
douroosta, behind	makava, don't
jirr, quickly	ka, if
ro ro, slowly	pára, sake of
man rwaz, to-day	wodya, gratis
paroon, yesterday	az, than
sabhá rwaz, to-morrow	o, hollá
ba, till	sarra, with

mudám, always
kala, when
cherta, where

wo, and
ya, or
belá, without
wale, but

Vocabulary of Nouns.

rwaz, day,
shpa, night,
halak, boy,
zoe, son,
jilai, girl,
loor, daughter,
pe*gh*la, maid,
plár, father,
mor, mother,
uror, brother,
khor, sister,
oba, water,
or, fire,
dode, bread,
*gh*ahar, city,
kalai, hamlet,

ás, horse,
aspá, mare,
osai, deer,
*kh*ar, ass,
*gh*àtar, mule,
behan, colt,
yaboo, poney,
chirg, fowl,
chirga, hen,
kaftara, pigeon,
gidada, fox,
cha*gh*ál, jackal,
koj̈, hyena,
spai, dog,
pishee, cat,
muj̈'ak, mouse,

yaj̈, bear
bizo, monkey
sarkaza, hog
bza, she-goat
waz gadai, he-goat
mur*gh*umai, kid
mej̈ ewe
maj̈, ram
warg maj̈, fighting ram
dusherlá, middling ram
psherlai, ram
wuchkulai, ram
urai, lamb
*gh*wa, cow
*gh*wáyai, bull
su*kh*wanda calf

kij̈de, tent woollen
kor, house
*kh*oona, room
*gh*ole, a yard
wanai, tree
bootai, bush
tir*kh*, brushwood
már, snake
tá ooz, peacock
zirká, Greek partridge
huja, leak
gazir, carrot
mal*kh*aze, thyme
anár, pomegranate
hindwáná, water melon
mana, apple
meda, man
*gh*aza, woman
mándiná, female
náreená, male

chu*gh*uka, sparrow
oo*gh*, camel
*gh*anum, wheat
wurijjee, rice
urbushee, barley
na*kh*ud, pulse
phascolus, maximus
pyáz, onion
tanzire, partridge
kurak, quail
thalla, sole of foot
war*gh*awe, palm of hand
punda, heel
padkai, ancle
pandai, calf
zangoon, knee
*kh*wale, perspiration
p*gh*a, leg
waroon, thigh
nas, belly

málgá, salt
tel, oil
*gh*odee, ghee
shakar, sugar
marach, pepper
largai, wood
kuchee, butter
hagge, an egg
shide, milk
maste, curds
shalumbe, butter-milk
lástai, pestle
*kh*at, bedstead
tiltak, coverlid
bálight, pillow
nihále, bed
ospana, iron
surp, lead
mio, copper
kál, year
zyad, brass
myasht, month
sirazar, gold
speen zar, silver
tir*kh*a, bitter
garm, hot
sod, cold
klak, hard
narm, soft
porta, boad, } high
garan, dear
arzán, cheap
spuk, light
duroond, heavy
wach, dry
noombd, wet
zulf, lock of hair
tsoonee, woman's hair
bret, mustacheos
jeera, beard
arkh, armpit

kunatai, bullock
tatar, beast
lás, hand
oja, shoulder
sha, back
*gh*ádá, neck
shund, lip
*gh*ágh, tooth
zinne, chin
bárkhoo, cheek
paza, nose
sajme, nostril
stir*gh*a, eye
bánoo, eye-lash
waridza, eye-brow
tandai, forehead
*gh*waj, ear
partoo*kh*, trousers
partooga*gh*, breeches string
ozgár, idle
pagde, turban
*kh*aj, sweet
turwá, sour
mu*kh*, nail
spajme, moon
store, star
wáh, woo, wind
garz, dust
zoná, light
tyárá, darkness
angoor, grapes
oma, raw
pa*kh*a, cooked
shkar, horn
swa, hoof
changul, divided hoof
wadai, wool
pumba, cotton
jibba, language
*gh*wajai, hunger
tajai, thirst
kou*gh*, shoes

tirkhe, armpit
kund, widow
*gh*ke, a tear
meda, husband
*gh*aza, wife
dároo, gunpowder
purod, grass
*gh*alla, grain
speen, white
soor, red
tor, black
ábee, blue
zyad, yellow
sheen, green
mahee, fish
*gh*washe, meat
lmar, sun
rikeboona, stirrups
muloona, bridle
*gh*ar, hill
seen, river
*kh*ight, brick
nikka, grandfather
wurr nikka, great grandfather
masai, grandson

chaplai, slippers
doond, blind
gung, dumb
kooṇ, deaf
goḍ, lame with both legs
rást, straight
koj̄, crooked
tsappa, upset
lewânai, mad
*kh*apa, angry
ranzoor, ill
starai, tired
dard, pain
lár, road
safar, journey
noom, name
zeen, saddle
kad wasai, great grandson
kosai, great great grandson
zoom, son-in-law
warindára, sister-in-law
orara, nephew
orerá, niece
tra and aka, uncle
troree, aunt

Vocabulary of Verbs.

rátalal, to come
tlal, to go
rávdal, to bring
odal, to carry away
pátakedal, to place
odaradil, to rise
porta kawil, to raise
k*gh*enastan, to sit
a*kh*istan, to take
wenissa, to seize
*kh*udal, to eat
ch*gh*il, to drink
zbe*gh*il, to suck
chichil, to bite
*gh*w*kh*an, to chew the cud

talal, to weigh
ve pemawal, to measure
pa*kh*awal, to cook
*kh*las wal,
wáz wal,
paránatal,
} to open
tadal, to blind
parkawal, to cut
seere kawal, to tear
mátawal, to break
z*gh*astal, to run
lwastan, to read
girzedal, to stroll
skawul, to pull
pákawal, to wipe

jo owal, to chew
*kh*andil, to laugh
jadil, to weep
wahal, to beat
jagh } to call
kawal }
skandal, to pinch
gandal, to sew
beredal, to fear
tu*kh*edal, to cough
teláwúl, to push
gha*kh*á wal, to press
lád *egh*wurzawul, to spit
*gh*wul kawal, to ease one's self
leedal and katal, to see
tisháwul, to employ
bázee kawal, to play
waiyil, to speak
wuruk kawal, to lose
mudal, to die

purewatal, to fall
zejal, to bring forth
purawal, to borrow
por warkawal, to lend
put wal, to conceal
gha*kh*auwal, to bury
zij dedal, to tremble
*kh*áls wal, to loosen
garawul, to scratch
togawul, to pour
pookawul, to blow
mityaze } to make water
kawal, }
dakawul, to fill
jaghawul, to play on an instrument
lirekawal, putting away
mzaka kandan, to dig
pá*gh*al, to sow
waswá, to burn

—o—

Sentences and Dialogues.

The Afghán Salutation—"Roan bop."

Jod e *gh*a táze *gh*a *kh*ushal e *gh*a ragh*a*le ? { Are you well ? quite fresh ? quite happy ? welcome ?

Answer. Jha wose pa *kh*air wose ma*kh*wár reje. { May you be well. May all be right with you. May you never be badly off.

Sta noom sa de ? — What is your name ?
Ta soke ? — Who are you ?
Kum yánye ? — Who is there ?
Tási chare zai — Where are you going ?
Tási la kum záe rágháliyást — Whence come you ?
Dwa myásht me sooeedee chi la Candhára *rághale* yam { It is two months since I came from Candahar.
Dá lár da Shikarpoor de ? — Is this the road to Shikarpoor ?
Za *kh*abar neyam pa*kh*pula musapar yam { I don't know, I am myself a traveller.
Lár wa*gh*aiya — Shew the road.
Tsa *kh*abrá la Bádsháh ávaradileeyast ? { Have you heard any news of the king ?

Wai ee chi Shikarpoor ta wara seda. } They say he has arrived at Shikarpoor.

Da Hinduwáno pa kágh*a*z kghe da Harát da bábata tsa kg*h*elawoo? } What was the news from Herat in the Hindoo's letter?

Kshilawoo da kajar tag o da Kamran chapáw pa Farrah bánde oda Mahammad Siddeek *Kh*án bandee wodal. } It was written that the Persians had retired, and that Kamran had made a descent on Farrah, and taken away Mahammed Sideek Khán prisoner.

So rwaze soo,ee dee chi Kásid la Loodiáne rágh*a*le de? } How many days is it since a Cossid arrived from Loodiana?

Ka za durwágh zam na gham pinz rwaze soo i dee } If I remember right it is five days.

Wale jar ra nag*h*ale? Why have you not come quickly?

Ma psheen spareshan } I will go out riding by afternoon prayers.

Za be *kh*artsa yum muwajam me ráka? } I have no money, will you give me my pay?

Madar woka chi da hinde mudda poorá see } Wait till the bill of exchange be due.

Dode zmá da para pa*kh*aka chi wujee yum chi wa*kh*uram } Get ready dinner for me, as I am hungry and have an appetite.

Tsa bara sta zoe zma deedan lara ranágh*a*i? } What's the reason your son does not come to see me?

Sa lara da kár na kave? Why don't you do that?

Tasta sawe? What is become of you?

Ka za spansee darkam dá shpaj kameesa pa tso mazdooree ba jod ke? } If I give you ready money, what will you take for making six shirts?

Da *gh*ar moom laree ka na laree Has this mountain a name or not?

Sardárán da Candahár chi dee pa wakht da mukadame chi da cha tsa*kh*a tsa *gh*wadee a*kh*pul da ourate psol wa hag*h*a sadee ta giroje k*gh*ee dee } The Sardars of Candahar when they want to get money from any one in time of need, are in the habit of pawning their wives jewels

A*kh*pul maindina biya wo poohawee chi bya pa fand tara da*kh*pul psol bidta zeenee rávdá } They instruct their wives to get the jewels out of pawn by a contrivance of their own.

Pa Candahár ki jha ás tsa keenruet laree? } What is the price of a good horse in Candahar?

*Gh*a ás pa salor souwa pa lás razee A good horse can be got for 400 Rs.

Deráwat tso zara rupo, ee málya laree } What is the revenue of Derawat in thousands?

Der*gh* zara rupo,ee málya laree It is a revenue of 30,000 Rs.

Sháh Shuja chi ragh*h*alai woo Sardárán tola razá woo chi ghar warkee bagh*h*air la you Sardár Kohn Dil Khánchi waigil chi zma sar dai o da Kalá Kungre	When Shah Shuja appeared, all the Sardars were content to give up the city except Kohn Dil Khán, who said, my head with these parapets.
Tási arvedalai dai chi da Mahammad Shah aká Shikarpoor lare ragh*h*alai dai ?	Have you heard the uncle of Mahammad Sháh has arrived in Shikarpoor ?

—o—

Specimen of Afghan verse from Abdul Rahman.

Har matloob chigh*h*waje tá, uka da rabab	When the musician turns the screw of the Rebeck
Padá táuk jhee zmá zada kandee kabab	By each turn that is made my heart is burnt.
Chi saiye panagh*h*ma pa taránashum	When I pay attention to the tune and the tone
Dewána sham grewantsiree most okh*h*ráb	I get mad, and tear my clothes frantic and lost.
Hame tár hame guftar hose as arka	The strings and burthen of the song so distress me
Chi hetsok na takat laree na tab	That none could bear it or endure it.
Youve sáz, bulawáze da belto	Let there be music first, then the theme of absence,
Dream shaar paragh*h*az ka intikh*h*áh	Third, let a poet recite his good verses,
Tsalaram you sakeeye tar sangkgh*h*enee	Fourth, let a cupbearer be near
Che makh*h* na mahtáb ñ dilaivee na áftáb	Who has never been looked on by sun or moon—
Da talor wáda fitne dee pa tslor kunja	These four are four traitors in four corners—
O pinzame suráeedai da mai nab spajame wakt da noubahar o da zawanee	And the fifth be a bottle of the best wine, and the sixth the time of the new spring and youth,
Ou owam shugh*h*al da bayazoda kitáb	And the seventh reading of albums and books.
Chidá hoomree áfatoona sara tol shee	If all these wonders be collected together
Turo tsok saranga zeenee kande ijtanáb	Who can deliver himself from them ;
Chi dá hasee dilbarán par as arnaka	He who is not affected by any of these rarities
Ya ba devee yá deewaz dai yádawab	Must be either more than human, a wall or a beast.

Da tsargand bashee parhez da parhez ga	Here the abstinence of abstainers will be discovered
Kakádar shee pa spahade pa shráb	When they be surrounded by love and wine.
Za Rahman lareeyá zohda pana *gh*wadam	May God defend Rahman from hypocrisy ;
Dareeyá zohad ázáb de hamitab	Hypocrisy is trouble and reproach.

(True Copy)

H. TORRENS,

Depy. Secy. to the Govt. of India. With the Govr. Genl.

(Signed) R. LEACH.

ART. II.—SISUPA'LA BAD'HA, *or death of* SISUPA'LA *by* MA'GHA. *Translated, with Annotations, by* J. C. C. SUTHERLAND, ESQ.

Book I.—*The conference between* KRISHNA *and* NA'RADA.

Salutation to the fortunate GANESA !

श्रियःपतिःश्रीमतिशासितुंजगज्जगन्निवासोवसुदेवसद्मनि।
वसन्ददर्शावतरन्तमम्बराद्विरण्यगर्भाङ्गभुवंमुनिंहरिः ॥१॥

1. HARI, husband of SRI, dwelling in the fortunate abode of VASUDEVA, to reform the world, though himself the abode of worlds, saw descending from the sky, the sage, who sprang from a portion of the being, that was conceived in the golden mundane egg.

द्विधाकृतात्माकिमयंदिवाकरोविधूमरोचिःकिमयंहुताशनः ।
गतिस्तिरश्चीनमनूरुसारथेःप्रसिद्धमूर्द्ध्वज्वलनंहविर्भुजः ।
पतत्यधोधामविसारिसर्व्वतःकिमेतदित्याकुलमीक्षितंजनैः ॥२॥

2. Is this the Sun itself parted into two orbs? Is it fire shining with light divested of smoke? The motion of the luminary whose charioteer has no legs is curvilinear. The ascent of flame is a well known property of fire. What is this, which descends diffusing light around? Thus was the sage contemplated by wonder by the people.

चयस्त्विषामित्यवधारितंपुरातत:शरीरीतिविभाविताकृतिं ।
विभुर्विभक्तावयवंपुमानितिक्रमादमुंनारदइत्यवोधिस: ॥३॥

3. The sagacious hero gradually recognized him. First, he remarked a mass of light; then, perceived an organic shape; next, discerned the human form; and, lastly, knew him to be NA'RADA.

नवानधोऽधोवृहत:पयोधरान्समूढकर्पूरपरागपाण्डुरं ।
क्षणंक्षणोत्क्षिप्तगजेन्द्रकृत्तिनास्फुटोपमंभूतिसितेनशम्भुना ॥४॥

4. Who, gray like a heap of levigated camphor, clearly resembled for a moment (whilst close under vast fresh clouds,) SAMBHU whitened with ashes, and clad in the skin of a mighty elephant thrown over [his shoulder].

दधानमम्भोरुहकेशरद्युतीर्ज्जटा:शरच्चन्द्रमरीचिरोचिष: ।
विपाकपिङ्गास्तुहिनस्थलीरुहोधराधरेन्द्रंव्रततीततीरिव ॥५॥

5. Who, shining like the Moon in the sultry season, and wearing braided locks, yellow as cream, and splendid like the filaments of the lotus, resembled the king of mountains covered with multitudes of twining plants that thrive in the region of snow.

पिशङ्गमौञ्जीयुजमर्ज्जुनंचक्षुर्विवशानमेणाजिनमञ्जनद्युतिं ।
सुवर्णसूत्राकलिताधराम्बरांविडम्बयन्तंसितवाससस्तनुं ॥६॥

6. Who, brilliantly white, girt with a yellow cord made of hyacinthoid alectris, and clad in the skin of a black antelope, shining like antimony, mocked the person of the hero, conspicuous by his black apparel, fastened to a golden cord.

विहङ्गराजाङ्गरुहैरिवायतैर्हिरण्मयोर्वीरुहवल्लितन्तुभि:।
कृतोपवीतंहिमशुभ्रमुच्चकैर्घनंवनान्तेतडितांगुणैरिव ॥७॥

7. Who, white as snow, and wearing for a scarf a string made of the fibres of climbing plants, gathered from the golden soil, and long like the down on the body of the king of birds, resembled a cloud streaked with flashes of lightning, in the season in which clouds become unfrequent.

निसर्गचिचोज्ज्वलसूक्ष्मपक्ष्मणालसद्दिसच्छेदसिताङ्गसङ्गिना ।
चकासतं चारुचमूरुचर्म्मणाकुथेननागेन्द्रमिवेन्द्रवाहनं ॥८॥

8. Who, seemed the king of elephants that bears INDRA, ornamented with trappings made of the beautiful skin of a spotted deer, covered with hair, delicate, glossy, and naturally variegated, decorating a body white like the slips of the stalk of a lotus.

अजस्रमास्फालितवल्लकीगुणच्छतोज्ज्वलाम्भुष्ठनखांशुभिन्नया ।
पुरःप्रवालैरिवपूरितार्द्धयाविभान्तमच्छस्फटिकाक्षमालया ॥९॥

9. Who held a rosary of clear crystal beads, but seemingly half filled with coral beads, in front being divided by the rays, emitted from the nail of his thumb, reddened by the strings of his lute continually struck by him.

रणद्विराघट्टनयानभस्वतःपृथग्विभिन्नश्रुतिमण्डलैःस्वरैः ।
स्फुटीभवद्ग्रामविशेषमूर्च्छनामवेक्षमाणंमहतींमुहुर्मुहुः॥१०॥

10. Who looked again and again at his lute surnamed "the large," wherein the rising and descending melodies of various octaves became distinct, by musical notes, which consist of different sets of measured sonorous lengths, and which were separately sounded by the impulse of the breeze.

निवर्त्त्यसोऽनुव्रजतःकृतानतीनतीन्द्रियज्ञाननिधिर्नभस्वतः ।
समासदत्साधितदैत्यसंपदःपदंमहेन्द्रालयचारुचक्रिणः ॥११॥

11. That Treasure of Knowledge, which is possessed by such as have subdued their passions, dismissing the inhabitants of the sky, who followed him with humble salutations, alighted at the house of him who is armed with a discus, and has stript demons of their conquests, an abode elegant like the palace of INDRA.

पतत्पतङ्गप्रतिमस्तपोनिधिःपुरोऽस्ययावन्नभुविव्यलीयत ।
गिरेस्तडित्वानिवतावदुच्चकैर्जवेनपीठादुदतिष्ठदच्युतः ॥१२॥

12. The devout saint, an image of the descending Sun, was not yet standing before the immortal hero, when he hastily rose from his lofty throne, like a thunder-cloud from a mountain.

अथप्रयत्नोन्नमितानमत्फणैर्धृतेकथञ्चित्फणिनांगणैरधः ।
न्यधायिषातामभिदेवकीसुतंसुतेनधातुश्चरणोभुवस्तले ॥१३॥

13. The son of DHATRI alighted before the son of DEVAKI, and as the feet of the saint touched the surface of the earth, it was hardly upheld by multitudes of serpents underneath, who bowed, in despite of their exertions to raise their dilated necks.

तमर्घ्यमर्वादिकयादिपूरुषःसपर्य्ययासाधुसपर्य्यपूपुजत् ।
गृहानुपेतुंप्रणयादभीप्सवोभवन्तिनापुण्यवतांमनीषिणः ॥१४॥

14. The primeval being shewed due honour to that venerable person with an *arghya* and other ceremonies; for wise persons enter not, with complacency, the houses of them who do not perform the sacred rites of civility.

नयावदेतावुदपश्यदुत्थितौजनस्तुषाराञ्जनपर्व्वताविव ।
स्वहस्तदत्तेमुनिमासनेमुनिश्चिरन्तनस्तावदभिन्यवीविशत् ॥१५॥

15. Ere the people observed them, as they stood rivalling mountains of snow and of antimony, the primeval sage had made the saint sit down in front of him on a seat presented with his own hands.

महान्महानीलशिलाउचःपूरोनिषे दिवान्कंसकृषःसविष्टरे ।
श्रितोदयाद्रेरभिसायमुच्चकैरचूचुरच्चन्द्रमसोऽभिरामतां ॥१६॥

16. Sitting on a lofty throne before the foe of KANSA (who shone like a vast sapphire) the sage exhibited the beauties of the Moon resting on the orient mountain opposite to the dusk at eve.

विधायतस्यापचितिंप्रसेदुषःप्रकाममप्रीयतयज्जनांप्रियः ।
यहीतुमार्द्यान्परिचर्य्ययामुङ्मंहानुभावाहितान्तमर्धिनः॥१७

17. The being who is dear to pious votaries, pleased the saint by special honour shewn to him as he sat down; for the wise delight in repeatedly conciliating venerable guests by respectful treatment.

अशेषतीर्थापहृतःकमण्डलोर्निधायपाणावृषिणाभ्युदीरिताः ।
अधोवविध्वंसविधौपटीयसीर्नतेनमूर्द्धाहरिरग्रहीदपः ॥१८॥

18. HARI bowed his head as he received the fluid poured into his hands by the sage from a gourd, which contained water collected from every holy stream, and most efficacious to remove all taint of sin.

सकाञ्चनेयचमुनेरनुज्ञयानवाम्बूदश्यामवपुर्न्यविक्षत
जिगायजम्बूजनितश्रियःश्रियंसुमेरुशृङ्गस्यतदातदासनं ॥१९॥

19. The golden throne on which the hero, whose body was black like a fresh cloud, sat down at the bidding of the saint, surpassed the beauty of the cliff of *Sumeru*, embellished as it is by the fruit of the *Eugenia*.

सतप्तकार्त्तस्वरभास्वराम्बरः कठोरताराधिपलाञ्छनच्छविः ।
विद्युतेवाडवजातवेदसःशिखाभिराश्लिष्टइवाम्भसांनिधिः ॥२०॥

20. Resplendent like the orb of the Moon, and clad in apparel that equalled the lustre of tried gold, he resembled the ocean embraced by the flames of submarine fire.

———o———

ANNOTATIONS—BOOK I.

V. 1. BRAHMA was born in an egg bright as gold (Menu, c. i. v. 9.) and from his hip sprang NARADA. KRISHNA being an incarnation of VISHNU bears the titles of that deity; the name HARI, and the attribute of pervading and containing the universe are therefore given to him, at the same time that he is mentioned as the son of VASUDEVA. His wife RUKMINI is in like manner considered as an incarnation of SRI or LUKSHMI. In the original, SRI is the first word of the couplet, purposely introduced there as an auspicious beginning of the Poem.

V. 2. The first part of this triplet is an interpolation. The Scholiast leaves it unnoticed. ARUNA is the dawn, or the Charioteer of the Sun, and is figured without lower extremities.

V. 3. The sagacity of KRISHNA is here meant to be contrasted with the stupid wonder of the people.

V. 4. On certain festive days SIVA dances before his wife PARVATI.

V. 5. The mineral anjana that used for collyrium is here meant.

V. 6. BALARAMA, brother of KRISHNA, derives several of his titles from the black apparel constantly worn by him.

V. 7. VISHNU's bird named *Garuda*, is surnamed King of Birds. The down on his body is figured as much larger than that which is observed in his kindred of royal vultures.

The King of Vultures, if the bird usually so named were meant by Sir William Jones, (As. Res. vol. vi. p. 128), has been described as a native of America and the West Indies. The Pandits of Behar suppose the gigantic crane to be the *Garuda*.

V. 8. The spotted Axis is the species of deer alluded to in this place. *Airavata*, surnamed King of Elephants, bears INDRA, the sovereign of demi-gods. He is figured white like the royal elephants of Ava.

V. 9. NARADA being an ascetic is painted as here described, with a rosary in one hand, and his Indian lute in the other, his hair braided like an anchorite, his complexion fair, and his body covered with ashes, a sacerdotal string by way of scarf, a yellow cord round his waist, and the skin of an antelope on his shoulders.

V. 10. NARADA's lute, surnamed *Mahati* or "the large," SARASWATI's is called "*Kachhapi*" (testudo). as VISWAVASA's *Vrihati* or "the best," and TUMBURU's "*Kalavati*."

P 27938 CENTRAL LIBRARY 14120

The dissertation of Sir W. Jones, on the musical notes of the Hindoos, may be consulted (A. R. vol. iii. p. 45). *Murchana* is here rendered according to the passage quoted by the Scholiast from a musical treatise. "The ascent and descent of the seven notes in due order are called *Murchha*." There are seven in each octave, and consequently twenty-one in the three octaves.

V. 11. The knowledge of God is attained by completely subduing worldly appetites. The discus is KRISHNA's weapon of offence.

V. 13. DHATRI is a title of BRAHMA. DEVAKI was mother of KRISHNA. In the infernal regions vast serpents, analogous in figure to the common Naga, are supposed by Hindu mythology to uphold the world on their dilated necks.

Their sensation of NÁRADA's weight as he alighted, is termed by the Scholiast a beautiful exaggeration.

V. 14. Water with rice and grass presented to a guest in an oval vessel is named *Arghya*. It is one of the most auspicious ceremonies at the solemn reception of a guest.

V. 15. Primeval sage, like primeval being in the preceding verse, is a title of VISHNU, applied like all other titles and attributes of that deity, to KRISHNA.

V. 16. KANSA was slain by KRISHNA. The Scholiast cites a passage from AGASTYA where sapphires (if this gem be really meant by the Sanscrit terms *Maha Nila* and *Indra Nila*) are described as produced in mines in the island of *Sinhala* or *Silan*.

The earth is supposed by Hindu poets and mythologists to be terminated by mountains. The Sun rises from behind the eastern range, and sets behind the western.

V. 18. NARADA, like other ascetics, bears a gourd by way of water-pot; making continual pilgrimages he had attached water from every holy river or lake.

V. 19. In conformity with the opinion of the Scholiast, *Jumbu* is here taken for the fruit of the *Eugenia*, which when ripe is of a very dark colour; but *Jumbu* is also the name of a river which flows from the mountain *Sumeru*.

V. 20. The notion of submarine fire may be founded on volcanic phenomena observed in ancient times.

ART. III.—*On the Geographic Distribution of Birds, but more particularly of the European Species; with a critical examination of Mr. Swainson's account.*[1] *By* WM. JAMESON, ESQ., *Bengal Medical Service.*

The advantages to be derived from a study of the geographic distribution of the organic and inorganic kingdoms, as presented to our view at the present day, are of the greatest importance, seeing that until this subject has been properly examined, that of a former world must remain imperfect; and probably if more attention had been paid to it, many of the numerous errors connected with the distribution of fossil animals would not have been committed. Lately the foot-marks of birds[2] have been discovered in a formation *said to be as old* as the new red sandstone; and the author, from an examination of these marks, has not only been able to point out the genus, but even characterise the species. The presumption in doing this, is scarcely

1 Read to the Wernerian Natural History Society of Edinburgh.

2 Prof. Hitchcock in Sillim. American Journ. of Science.

CENTRAL LIBRARY

worthy of attention. Cuvier from an examination of the internal skeleton of birds, declared that it was, in many instances, impossible to tell the genus, far less than the species. Let us therefore receive with caution such observations, even although they have been considered as plausible by several of the leading geologists.[1] We examined the casts of those so called foot-marks, in the collection of the Royal College of Surgeons of London,[2] but were not at all convinced of their ornithological origin, and till we have further evidence than such impressions, we would be inclined to argue the contrary; for we are as much, or rather more, entitled to infer that they are only vegetable impressions.[3] To find the remains of birds in such a formation as the new red sandstone would invalidate one of the grand principles of geology.

In tracing out the geographic distribution of the animal and vegetable kingdoms, various methods have been adopted. Some authors, as Humboldt and Latreille, have attempted to trace them according to parallels of longitude and latitude; others, as Illiger,[4] Fischer,[5] &c., according to the various Continents—which no doubt is the most unobjectionable method; for we find, that when the former is properly examined, it will not stand the test of minute examination, seeing that we have in each of the individual Continents great groups entirely confined, and which have no representatives in any other of the other Continents under similar degrees of longitude and latitude, as we ought to find, if the views of Humboldt, &c. were correct.

Till the laws which regulate the distribution of both the organic and inorganic kingdoms are explained, such a method can never be adopted. We no doubt find secondary causes, such as light, heat, moisture, greater or less distribution of water, configuration of the land, exercising a powerful influence, which is particularly marked out in certain quarters of the globe; and from authors looking to these individual places alone, they have put more stress upon these causes than what we are entitled to do. Thus, for example, in Northern India, where we find the climate in some places to resemble so much the European, we have a large series of quadrupeds, birds, insects, plants, &c. either identical with the European, or undergoing such slight modifications, as to entitle them to be considered as mere local varieties, or at least the representatives of the European species.[6]

1 Buckland's Bridgewater Treatise.

2 For liberty to examine these we were indebted to Mr. Owen.

3 Our reasons for coming to such a conclusion we shall afterwards give.

4 Abh. d. Akad. d. Wiss. Zu. Berlin. 1806, p. 236 et 1812 a. 13, p. 221.

5 Synopsis Animalium et Conspect. Distribut. Geographiæ.

6 Vigors, Zool. Proc. Pt. i. pp. 7, 22, &c. Gould's Cent. of Birds. Wils. Cab. Lib. India, vol. iii. p. 78. Jameson, Wern. Trans. in Ed. New Phil. Jour.

But although these secondary causes seem to have a certain influence in some places, yet that is far from being universal, all appearing to be subject to some great principle hitherto undiscovered, and which will probably remain for ever so.

Nor is it alone in the organic kingdom that we find the distribution liable to vary from unknown causes. In the mineral kingdom we observe phenomena of a similar nature. Thus we find, as has been well remarked, "the geographical distribution of minerals to be very different from mountain rocks; we do not find the same species everywhere, on the contrary, they seem to have many kinds of distribution, in this respect approaching more nearly to what we observe in the physical arrangement of animals and vegetables on the surface of the earth."[7]

It is foreign to our purpose at present to give all the methods which have been proposed by Humboldt, Latreille, Fabricius, Swainson, &c. in order to point out the erroneous grounds upon which they are based, but shall at present confine our attention to that one most recently given, viz. by Swainson; and as he has entered into some detail, in regard to the birds of one of his divisions, allowing us an opportunity of refuting his statements, we shall therefore direct particular attention to it; we are the more induced to do so, as no person has ventured to point out the erroneous views of this author, which seem to have been based upon a few and unsatisfactory data.

By Mr. Swainson the globe has been divided into a series of zoological regions or provinces, denominated, 1st. the European or Caucasian; 2d. Asiatic or Mongolian; 3d. the American; 4th. the Ethiopian or African; and, 5th. the Australian or Malay. In the European or Caucasian province he includes the whole of Europe properly so called, with part of Asia Minor and the shores of the Mediterranean. In Northern Africa, he states, the zoological peculiarities of this region begin to disappear; they are lost to the eastward of the Caucasian mountains, and are blended with those of Asia and America to the north. 2. The Asiatic range comprehends the whole of Asia east of the Ural mountains, which form a natural and well defined barrier between the two Continents. The chief seat of this zoological region is, he states, probably in Central Asia; its western confines blend into the European towards Persia, and disappear in the west of the Caucasian chain; it is united to the African range among the provinces of Asia Minor, and is again connected with Europe, and also with America, by the arctic regions of the three Continents; finally, its

7 Jameson, Werner Trans. Annals of Phil. vol. vi. p. 301.

most southern limits are marked by the islands of Java and Sumatra, where the zoological characters of the Australian regions begin to be apparent. 3. The American province, he states, is united to Europe and Asia at its northern limits, and comprehends the whole of the New World, but into which it blends at the other extremity is uncertain. 4th. The African province. In it he includes the whole of Africa south of the Great Desert; part, at least, of the countries on the Mediterranean exhibits a decided affinity to the European range; while the absence of large animals in Madagascar, and the presence of genera peculiar to New Holland and the extreme point of Southern Africa, lead us to the fifth, or Australian range. 5. Australian province. Australia, New Guinea, and the neighbouring islands, mark its limits in that direction; Australia Proper is its chief seat, and it spreads over the whole of the numerous islands in the Pacific Ocean; and he moreover remarks, whether this province blends with that of America or Europe, remains for further discovery; but its connexion with Africa and Asia has been already intimated. That the zoology of each of the individual Continents blend with each other at their junction, is a fact that never once has been questioned; but with regard to Madagascar forming the connecting link between Australia and the African Continent, Mr. Swainson can claim no originality in this statement, seeing that it was several years before the publication of Mr. Swainson's elaborate work, pointed out by M. Lesson;[8] and it is a remarkable fact that lately several animals considered truly African have been detected in New Holland,[9] and, on the other hand, several pouched animals, which tribe were supposed to be peculiar to New Holland and America, have been discovered in Madagascar.

The divisions which Mr. Swainson has proposed, appear at first sight very plausible; but when thoroughly inquired into, will not bear the test of examination. Thus to arrange under one and the same division the Continents of North and South America, Mr. Swainson has taken for granted what nobody has admitted, or can admit, viz. that the geographic distribution of birds is subject to the same laws as those which regulate man.[10] Upon this argument the whole of his divisions seems to be founded, which is quite at variance with all that is yet known in regard to the geographic distribution of animals. In fact, there is no ground whatever for such an argument; nor have we any evidence whatever, on the other hand, to maintain that

8 Annal. de Science Nat. 9 Proceedings of Zool. Soc. of London.

10 The divisions adopted by Mr. Swainson being in accordance with the views of Dr. Pritchard in regard to the distribution of man.

man is liable to be influenced by the same physical laws as those which act upon the lower animals.

If we take into consideration the Continents of North and South America, we shall find them fully as well, if not better, marked out as zoological provinces—at least South America—than any of the others enumerated by Mr. Swainson. Thus among the *Mammalia* in South America, we find, the genera *Priodon, Apara Encoubertes. Dasyprocta Hydrochaerus, Cœlogenys,*[10] &c. entirely confined; and in regard to the ornithological kingdom, the genera *Pipra, Rupicola, Alector, Crax, Penelope, Dicholophus, Crotophaga, Rhamphastos, Rhea Tanagra, Trochilus,* &c. are almost entirely unknown in the Northern Continent. No doubt a few extend their migrations as far north as Mexico; and of the family *Trochilidæ*, or Humming-Birds, four are found throughout the Continent of North America; two[11] of these however must be considered as accidental. One, the *Trochilus colubris*, extends as far north as the 57° or 58° on the west coast,[12] it also frequents the warm plains of Saskatchewan, and Mr. Drummond found its nest near the sources of the Elk river. It advances towards the north as the season lengthens, and delays its visits to the Northern States till the month of May, and still as remarked by Nuttal, as if determined that no flower shall blush unseen, or waste its sweetness on the desert air, it launches at once on wings as rapid as the wind, without hesitation, into the flowery wilderness which borders on the arctic circle.[13] Another species, *Trochilus rufus*, first discovered by Captain Cook at Nootka Sound, hence denominated the Nootka Sound Humming-Bird, has a much more extensive range, having been found by Kotzebue as far north as the 61° parallel of latitude on the Pacific coast; and there are specimens in the Edinburgh Royal Museum of the same species from Mexico. Specimens have also been observed by Swainson from the same quarter, being killed near Real del Monte. In the *Trochilus* (*ornismya*) *sephanoides*, Less. we see a similar distribution in the Southern Continent, it having been discovered by Captain King at the Straits of Magellan, and in honour of whom it has been named the *Melisuga Kingii* by Vigors,[14] although erroneously, for it does not at all differ from

10 For the different genera of quadrupeds proper to the two continents of America, see Illiger. Loc. Cit. Fischer. Loc. Cit., and Richardson's excellent Report on North American Zool. in Trans of Brit. Asso. vol. v. for those found in North America.

11 Audubon's Amerc. Ornith.

12 Nuttal's Amerc. Ornith. vol. ii. p. 605.

13 Nut. vol. i. p. 585.

14 Zool. Journ.

Lesson's species,[15] who is quite correct in giving this name as a synonym. Lesson's specimen was received from Chili, and in the Edinburgh Museum there are several specimens, one of which was received by Professor Jameson from Mexico. The occurrence of Humming-Birds and Parrots in such high southern latitudes was long ago pointed out by Cook. His observations, however, were called in question, and denied by Buffon, but happily found to be quite correct by King.[16] But are four species, two of which are accidental visiters, to be considered equivalent to nearly one hundred which are confined to the Continent of South America ?[17] The same applies to the *Tanagers ;* for of the three species found in North America, one alone is proper to it, the other two being also found in South America. The species we allude to, are the *Tanagra rubra,* Lin. and *T. astaca* Gm. Numerous other examples could be given from the families *Psittacidæ, Falconidæ, Musicapidæ, Tyrannidæ, &c.* tending to shew the exclusiveness of the ornithology of South America. Again, when we turn our attention to North America,[18] we find it characterized by certain tribes, which however are not so numerous as those of the other Continent, but quite sufficient in number to mark it out as provincially distinct from South America. But it is not only by the mammalogical and ornithological kingdoms that these Continents are so pre-eminently distinguished from each other. In every department of animated nature we find similar characters, to notice any of which is foreign to our subject at present. But although we have divided the Continents of America into but two provinces, yet we believe the time is not far distant when the mammology, ornithology, entomology, &c. shall be better examined, and more attention paid to the individual members of each class ; we shall then instead of two have many zoological provinces. For as in the botanical so in the zoological kingdom, we shall no doubt find series of birds, quadrupeds, &c. having as their fixed places of abode certain regions of the world, beyond which, although a few may migrate, yet upon a careful examination, the greater number will be found to be confined. This statement is well borne out by the collections which frequently reach this country.

Thus what ornithologist who has paid any attention to the subject of the geographic distribution of birds, could not at once distinguish a collection from Southern, from one from Western Africa ; or a collec-

15 Man. Ornith. vol. ii. p. 80. Hist. Nat. des Ois. Mouches, p. 69.
16 Zool. Journ.
17 In Mexico a good many species occur.
18 Richardson Loc. Cit. Faun. Bor. Amer. &c.

tion from Northern India, from one from Southern India; or a collection from the Malayan Peninsula from one from any other part of Asia. The same holds true in regard to collections from different parts of the American Continents. Moreover, in the Continent of Australasia we have an ornithology in the neighbourhood of Port Jackson quite different from that we find at Moreton Bay. Thus the *Alectura lathami*, Gray,[19] found at the latter, is not found in the neighbourhood of Port Jackson, its place being there supplied by the *Menura lyra* Sh. or *M. Novæ Hollandiæ* Lath. It has also been shewn by Professor Jameson, that even in some of the larger islands we have a zoology quite different from that we meet with in the adjoining Continents. Thus he states—In the island of Sumatra, which is only a secondary one in point of magnitude in the Archipelago of Notasia, we meet with the Elephant, Rhinoceros, Hippopotamus, &c.; but the species of animals are often different from those in the neighbouring Continents — . Thus the Rhinoceros of Sumatra is different from that of Asia. Madagascar produces many species of snakes, which are found no where else. The inhabitants of Van Diemen's Land are very different from those of New Holland, and the greater number of mammiferous animals and reptiles are specifically different from those met with in the neighbouring Continents.—That many of the islands of the Indian Archipelago have a zoology peculiar to themselves, has been proved by the researches of Raffles, Horsfield, Sonnerat, Leschenault, Reinwardt, Dussumier, Duvaucel, Diard, Belanger, Kuhl, &c., all of whom have increased our knowledge more or less in regard to them. Nor are the islands farther in the south without their own peculiar *Fauna*. Thus we find in New Zealand, not only a great many species, but even many genera which are found to exist no where else. It is here that we meet with that most extraordinary bird the *Apteryx Australis*, first described by Shaw, but whose existence has more than once been called in question,[20] although erroneously, as has been pointed out by Yarrel.[21]

In New Guinea we also meet with a particular *Fauna*. It is here that we find the splendid group of Paradise Birds. We have

19 Proc. Zool. Soc.

20 Lesson Tracte d' Ornith. p. 12. et Man. d' Ornith. vol. ii. p. 210.

21 Tran. Zool. Soc. vol. i. and Zool. Proceed. pt. i. pp. 24, 80. Of this bird there are now several specimens in Europe. In the collection of the Zoological Society of London we saw one specimen, in the Liverpool collection there is an imperfect specimen, and we believe that there is a very fine specimen in the collection of the Earl of Derby, from which Yarrel drew up his description and made his drawing. See Trans. Zool. Soc. vol. i.

therefore in our tables more for convenience, or rather till we get more information on the subject, arranged the birds under the heads of the different Continents, and including all the islands south of Java and Sumatra in the Continent of New Holland, adopting the term of Australasia.

Let us now enter more in detail, and trace out some of Mr. Swainson's so-called zoological provinces. We shall first notice his European or Caucasian Province.

In tracing out the geographic distribution of this province, Mr. Swainson has divided the birds into a series of groups, or orders, thus *Rapaces, Grallatores, Natatores, Gallinaceæ, Scansores,* &c., which we shall now notice individually. In regard to the first of these groups, he makes the following statement—"The rapacious order, next to the aquatic tribe, is of all others inhabiting the land the most widely spread. This is particularly the case among the nocturnal species. It is remarkable that of thirteen different Owls inhabiting Europe, six only are peculiar; and two of these more particularly inhabit the arctic regions. Of the rest, four occur in America, two in Southern Africa, and one both in Asia and America. The *Falconidæ,* or diurnal birds of prey, in regard to their species, have a more restricted distribution than the nocturnal; yet of these, the Eagles enjoy no inconsiderable range; of four discovered in Europe (I here use his own words[22]) one is more properly arctic, three have been found in several parts of Africa, and one occurs in America—leaving three only to Europe. It is singular, he continues, that those rapacious birds which, from the peculiar structure of their wings, have been supposed to enjoy the greatest powers of flight among their congeners, should nevertheless have a much more limited range. This is proved by the fact, that of eight genuine Falcons inhabiting Europe and Northern Africa, two only have been discovered in America. It has, however, recently been stated that the Peregrine Falcon of Australia is absolutely the same as that of Europe.[23] Upon the whole, the distribution of the forty-four European birds of prey appears to be thus regulated—three are more properly arctic; eleven are found also in America, two in Asia and Africa, and one in Asia and America; leaving *twenty-seven,* or more than one half, as

22 Geography and Classification of Animals, p. 22. See also Murray's Encyclop. of Geography, vol. i.

23 In regard to the identity of the Peregrine Falcon of Europe and Australia there can be no dispute. We examined minutely the specimen described by Horsfield and Vigors in the Linnæan Trans. now deposited in the Museum of that Society, but could not discover one trivial character of difference. For permission to examine it, and the collection generally, we were indebted to Prof. Don.

characteristic of European Ornithology." How Mr. Swainson could have come to such conclusions, seems to us very remarkable; not one of the statements which he has made, being at all correct. Thus of the thirty-five species of diurnal rapacious birds found in Europe and comprehended in the genera *Vultur, Neophron, Gypaetos, Falco, Aquila, Haliætus, Pandion, Circœtus, Astur Accipiter, Milvus, Nauclerus, Elanus, Pernis, Buteo, Butaetes,* and *Circus,* four are common to Europe and Asia; three common to Europe and Africa; three common to Europe and North America; ten common to Europe, Asia, and Africa; four common to Europe, Asia, and North America; one common to Europe, Africa (?) and North America; one common to Europe, Asia, and Australasia; one common to Europe, North and South America; one common to Europe, Asia, Africa, North and South America; and three (?) cosmopolite, or found in all the different Continents of the world; leaving only four species proper to Europe, or in the proportion of 1 to $8\frac{3}{4}$, and it is even doubtful at present whether all the four species are confined to Europe. But Mr. Swainson has marked out in a particularly prominent manner the genera of Falcons and Eagles, properly so called, in order to shew that the distribution of birds is not in an equal ratio with their powers of flight—a statement no doubt quite correct; but he has been very unfortunate in his illustrations, for among all the tribes of European birds, the Falcons and Eagles possess a most extensive distribution. Thus of the nine species of Falcons (one or two of which seem to be only occasional European visitants), two alone are proper to Europe; three common to Europe and Asia; one common to Europe and Africa; one common to Europe and North America; one common to Europe, Asia, and North America; and one common to Europe, Asia, Africa, Australasia, North and South America.[24]

That the maxim, as the powers of flight so is the distribution, is not correct, many instances could be given; and in no tribe have we a stronger evidence to the contrary than in the *Rallidæ,* seeing that they exist in the western hemisphere, so far north as Hudson's Bay, and in the eastern, as far south as the Sandwich islands, having thus a range of about 105° of latitude, and nearly 280° of longitude; and it is well known that the powers of flight in this

24 Ch. Luc. Bonaparte, in his Catalogue of American and European Birds, gives a new name to the Osprey of America; upon what grounds we know not. Gould in his work on the Birds of New Holland, now publishing, has described the Osprey of that quarter as a new species, to do which he is not at all entitled, there being no characters whatever presented to mark them as specifically distinct. In the Ed. Museum there is one specimen from New Holland, agreeing in every character with specimens, killed in Europe. The same remarks apply to the American species.

tribe is not at all well developed, at least to such a degree as to account for its extensive distribution. Nor does this remark apply to this group alone, many other examples, if it were necessary, could be given. In regard to the Eagles, Mr. Swainson's statements are equally inaccurate. Thus of the nine Eagles included in the genera *Aquila, Haliætus, Pandion,* and *Circaetus,* two are common to Europe, Asia, and Africa; one common to Europe and North America; one common to Europe and Asia; one common to Europe and Africa; two common to Europe, Africa, and North America; one cosmopolite; leaving only one proper to Europe; for it seems not at all improbable, that the *Aquila imperialis* will be found extending throughout the African Continent.[25] Moreover it may be stated as a general rule, that in whatever families we observe a large series of modifications, there we have a wide distribution. This is strikingly the case in the *Falconidæ, Anatidæ, Sylviadæ, Muscicapidæ, Columbidæ, Fringillidæ, Laridæ, Turdidæ, Laniadæ,* &c. Nor is this rule confined to the ornithological kingdom; we have a similar arrangement exhibited in the mammalogical, as well as in many of the other kingdoms of the organic world; and when we direct our attention to the inorganic, we can trace out a similar arrangement. Thus in those families in the mineral kingdom in which the physical and external characters are very various, in them we find a most extensive distribution, as is well exemplified by the quartz, calcareous spar, and garnet families, modifications of which occur in every formation, from the oldest up to the newest; in every climate, from the inhospitable regions of Melville island to the tropics, and in all the intermediate spaces; and, on the other hand, from the tropics as far south as 70°, and also at all heights and depths yet attained by man, viz. from 20,000 feet above, to 1600 feet below, the level of the sea.[26]

In regard to the nocturnal birds of prey, comprehended in the genera *Strix, Bubo, Otus, Scops, Surnia, Ulula, Syrnium,* and *Noctua,* we have the following statement to make, which is quite at variance with that given by Swainson. Thus of the fifteen Owls found in Europe, three only are proper to it, one of these doubtful; common to

25 Mr. Gray, in General Hardwicke's Work on Indian Zoology has figured a bird under this name, which however is quite a different species. The specimens noticed in the Asiatic Society's Journal for November, 1838, as varieties of the *Aquila chrysaetos* by Dr. Evans, are quite different birds; in fact they do not belong to the genus *Aquila* at all, being characteristic specimens of the genus *Haliætus.* The bird is a new species, and the only other specimen we have seen is in the collection of the Zoological Society, London.

26 Jameson's manuscript Lectures on Miner. see also Man. and Syst. of Mineralogy.

Europe and Asia, two; to Europe, Asia, and Africa, two; to Europe and North America, five; to Europe, Asia, North and South America, one; to Europe, Asia, Africa, and North America, one; to Europe, Australasia, and North America, one; thus leaving a proportion of 1 to 5; and from these statements it appears evident that the nocturnal birds of prey do not possess such a wide distribution as the diurnal, as stated by Swainson.

But Mr. Swainson in summing up his observations gives, as already stated, 27 species as peculiar to the European or Caucasian province—a number four times larger than we from a most careful and extensive examination have made it; the number being only seven, and it is even doubtful whether all these are peculiar to this so called zoological region or province.

Having now finished our analysis of the distribution of the Rapacious order, we shall now proceed to another of Mr. Swainson's divisions, viz. the *Gallinaceæ*, whose distribution we shall follow out in a similar manner. "On looking,"[27] says he, "to the whole number of our *Gallinaceæ*, we find twenty seven species, fourteen of which have their metropolis in Europe; the remainder are thus dispersed—five extend to Western Asia; five to the confines of the great African Desert; two are dispersed over Central Asia and Africa; whilst two occur in North America." In the above statements Mr. Swainson differs very considerably from our examination; at least it is difficult to understand what he has included in his *Gallinaceæ*, for to make up the number of species we must include the genera *Columba*, *Tetrao*, *Bonasia*, *Lagopus*, *Pterocles*, *Francolinus*, *Perdix*, *Coturnix*, *Hemipodius*, *Otis*, *Cursorius*, and *Glareola*, comprehended under which we have twenty-seven species; of course leaving out the *Tetrao rupestris*, a doubtful species, and which has only been met with in Europe once or twice. Nor do we include the *Phasianus colchicus*, an imported species. We however comprehend the *Tetrao hybridus*,[28] considered erroneously by some naturalists as a hybrid between the *Tetrao urogallus* and the *Tetrao tetrix*, it presenting many characters to mark it out as a distinct and well marked species. Of the twenty seven species found in Europe, five are common to Europe and Asia; three common to Europe and North America; one or two (?) common to Europe and Africa; and four common to Europe, Asia and Africa; thus leaving fourteen proper to Europe, or in the proportion of nearly 1 to 1; and of these, one alone is peculiar to the British islands, which is

27 Loco. Citato. p. 23.

28 Yarrel, Proc. Zool. Soc. Gould's Birds of Europe.

rather curious, it being the only bird which is so. Moreover the manner in which Mr. Swainson has traced the distribution of this tribe is much to be questioned, it appearing to us a more plausible than real one, many of his statements no doubt being founded on the peculiarity of the country; at least we are not at all aware of any thing being stated by any author which would authorize him to make such statements, and he makes no mention of being guided by personal examinations, which he no doubt would have done had he travelled in these regions, seeing that there is no individual more ready to inform us of the extent of his travels.

In regard to his next division, we have the following statement—[29] "The Swallow-like birds, *Fissirostres*," says he, "are well known by capturing their food on the wing, and by their migratory habits; only one, the common or European Kingfisher, being stationary. Hence it is, that most of the European species occur in other regions; the proportion of those which appear confined to Northern Africa is as 1 to 3." He does not give any more details in regard to the *Fissirostres*, leaving his readers to fill up the rest by their own imagination. In his proportional number of species he is not correct. Thus of the fourteen included in the genera *Hirundo, Caprimulgus, Merops, Coracias, Alcedo,* three are probably confined to Europe; and of the others, three are proper to Europe and Asia; to Europe and Africa, three; to Europe, Asia, and Africa, three; to Europe, Africa, and North America, one; and to Europe, Asia, Africa, and North America (?) one; thus leaving a proportion of 1 to $3\frac{4}{6}$; but as many of the species, as stated by Mr. Swainson, of this order are migratory, it renders the proportional number very doubtful; at least it is very liable to vary.

In regard to the *Scansores*, Mr. Swainson states their number to be fifteen, including probably the genera *Picus, Apternus, Yunx, Sitta, Certhia, Tichodroma, Upupa,* and *Cuculus,* eight of which he states are confined to Europe; and as for the distribution of the other seven, as in the *Fissirostres*, he gives us no information. The number of species however is eighteen, and of these eleven are proper to Europe; two common to Europe and North America; three common to Europe and Asia; one common to Europe, Asia, and Africa; and one, the Wryneck (*Yunx torquilla*) common to Europe, Asia, and North America, which was many years ago pointed out.[30] Whether all of the above ten species are proper to Europe, is at present a question, owing

29 Loc. Cit. p. 24.

30 Jam. Edin. New Phil. Jour. and James Wilson's Quart. Rev.

to the near approximation of several species from Northern India, which still require further examination ; and before the point can be settled, a large series of specimens will require to be examined. In the Indian Creeper (*Certhia vitticauda*, Jam.)[31] and Indian Nuthatch, (*Sitta Himalehensis*)[32] although we have many characters in common with the European, yet still there are many others entitling us to consider them as specifically distinct. The occurrence of the former species in Northern India was a most interesting discovery, pointing out that the genus *Certhia* is more widely distributed than was originally imagined. In several of the Woodpeckers of Northern and Southern India we have also a great similarity with the European species, and in fact so remarkable, as to cause several of the more recent writers to consider them as identical.

In noticing the Crow and Starling families (*Corvidæ* and *Sturnidæ*) Mr. Swainson has made some most extraordinary statements. Thus he states that not only several species, but even peculiar genera are left to characterise this portion of the world. To us this is quite unintelligible. Species we have, we will admit, but as for genera in this group peculiar to Europe, there are none ; and even among the whole birds of this so called province, there is not one genus peculiar to it, if we except one or two among the *Sylviadæ*, whose generic characters however must be called in question ; and even if they should latterly be found to be correct, it would give but little more weight to Mr. Swainson ; for there is no group hitherto more neglected, and of which our knowledge is so imperfect, than the *Sylviadæ*.

For many years, no doubt, the genera *Cinclus*[33] and *Nucifraga* were supposed to be confined to Europe ; but species belonging to the former have been found in North America and Northern India ; and in regard to the latter, we have one species occurring in Northern India, considered erroneously by some authors as identical with the European—it is the *Nucifraga hemispila* of Vigors. We shall after-

31 This bird has received other two names. It has been described by Vigors as the *Certhia Himalayana*, Proc. Zool. Soc. Pt. i. p. 174, and by Swainson as the *Certhia Asiatica*, Anim. Menag. p. 353.

32 Jard. and Selb. Zool. Illust.

33 The distribution of the Dippers stands thus—In Europe we have two species, one proper, the other being also found in Northern India. In America N. and S. (?) one species (*Cinclus Americanus*). The new species described by Bonaparte is the above. Audubon, since the above was written, informed us that he had received two new *Cincli* and a true *Nucifraga* from the Rocky mountains, the latter however had been long before described as a *Corvus*. Brehm has described a third species under the name of *Cinclus melanogaster*, it however appears to me to be a mere variety of the *Cinclus aquaticus*.

wards notice the European genera in regard to their distribution, but in the mean time shall confine our attention to the distribution of the species. In regard to the species included in the genera *Corvus, Sturnus,* &c. Mr. Swainson states their number at twenty-one found in Europe, thirteen of which, or more than one half, habitually reside; four occur in Northern and Central Africa; one common to Europe, Asia, and Africa; and three found in America. Nor are the above statements even in regard to the species correct. Thus of the seventeen species, for we cannot make out more, included in the genera *Corvus fregilus, Pyrrhocorax garrulus, Nucifraga, Pastor,* and *Sturnus,* six are proper to Europe; four common to Europe and Asia; one common to Europe and Africa; three common to Europe, Asia, and Africa; two common to Europe, Asia, and North America; and one common to Europe, Asia, Australasia (?) and North America. We mark Australasia with an interrogation, for the occurrence of the *Corvus corone* in that Continent seems doubtful. It is upon the authority of M. Lesson,[34] that we make the statement; who, however, we rather think has confounded with it a nearly allied, but quite distinct species. M. T'emminck[35] has also in his Catalogue of the Birds of Japan given the *Garrulus glandarius,* and marks it as the Japanese variety, which it undoubtedly ought only to be considered, for the characters which it presents vary so little from those of the European, and are of such a trivial nature. It is not to be confounded with the *Garrulus bispecularis* of Vigors,[36] a well-marked species, also presenting a close affinity to the European, it however is confined to Northern India. In the *Garrulus melanocephalus,* Bon.[37] we have another species presented, bearing a close affinity to the European, but it not only differs in several characters, but also, like the two Indian species, has a quite different distribution, representing in its locality the common *Garrulus glandarius.*[38]

34 Ann. de Sci. Nat.
35 Man. d' Ornith. vol. iii. Introd.
36 Proceed. Zool. Soc. Pt. i. p. 7. Gould's Cent.
37 Gen. Mem. of the Acad. of Turin, vol. xxxvii. p. 298.
38 Strickland on the Birds of Asia Minor. Proc. of Zool. Pt. iv. p. 97.

(To be Continued.)

Art. IV.—*On a new Genus of the Fissirostral Tribe.* By B. H. Hodgson, Esq. *Catamandu.*

[*Note by the Editors.*—This and the following paper were transmitted to the late Editor more than two and a half years back, and were acknowledged at the time, though by some accident afterwards mislaid. The expert ornithologist will perceive that Mr. H's. genus *Raya* is equivalent to the *Psarisoma* of Swainson, and the *Crossodera* of Gould; but, by referring to dates, it will be seen that Mr. H. was the first person to characterise this new form, of which he has given two species.]

Dentirostres todidæ, Swainson.—*Fissirostres todidæ,* Vigors.—*Syndactyles,* Cuvier.

Genus—new, *Ráya nobis.* Species two, new, *Sericeogula* and *Rubropygia. Rai* and *Rai Súga* of the Nipalese. *Habitat,* Central and lower regions.

These singular birds might be considered with almost equal propriety as the Dentirostral type of the *Fissirostres,* or the Fissirostral type of the *Dentirostres.*

Swainson would regard them in the latter light; Vigors in the former; Cuvier would probably have placed them with hesitation among his *Syndactyles.* They seem to me to be compounded of *Tityra* and *Eurylaimus*—two parts of the latter, and one of the former.

The bill is shorter, broader, more arched along the culmen, less suddenly hooked, as well as more deeply cleft in the head than in *Tityra;* it is longer, and more covered by those frontal plumes which entirely conceal the nares, than in *Eurylaimus.* The nostrils have exactly the same character as in *Tityra,* but they are considerably more advanced, being nearer to the tip than to the gape. The wings agree in their gradation with those of *Tityra,* but they are shorter and feebler than in that genus, or in *Eurylaimus;* and in consonance probably with this feebler structure of the wing is the elongation and extreme gradation of the tail of our birds, a feature in which they differ alike from *Tityra* and from *Eurylaimus.*

The feet of the *Rayæ,* like their bills, more nearly resemble those of *Eurylaimus* than those of *Tityra;* and whilst they differ from *both* genera by the smoothness of the acrotarsia, they depart from their otherwise strict correspondences with the feet of the former genus by the essential circumstance of a more restricted junction between the toes. In *Eurylaimus* the exterior toe is united to the *end* of the second phalanx, the interior, to the *end* of the first. This, the typical syndactyle structure, is only half developed in *Ráya;* the connexion between whose lateral fore toes reaches forward only to the *middle* of the respective joints.

With these preliminary remarks we shall proceed to characterise the genus or sub-genus *Ráya*, thus—

Bill shaped as in *Eurylaimus*, but equal to the head, or longer, and having the soft frontal zone more produced, and concealing the nares; orbits nude; head large and crested; gape very wide and smooth; wings scarcely exceeding the base of the tail, rather feeble; the third and fourth quills longest and equal; the first and second, very slightly gradated; the primaries plus the tertiaries by about half an inch.

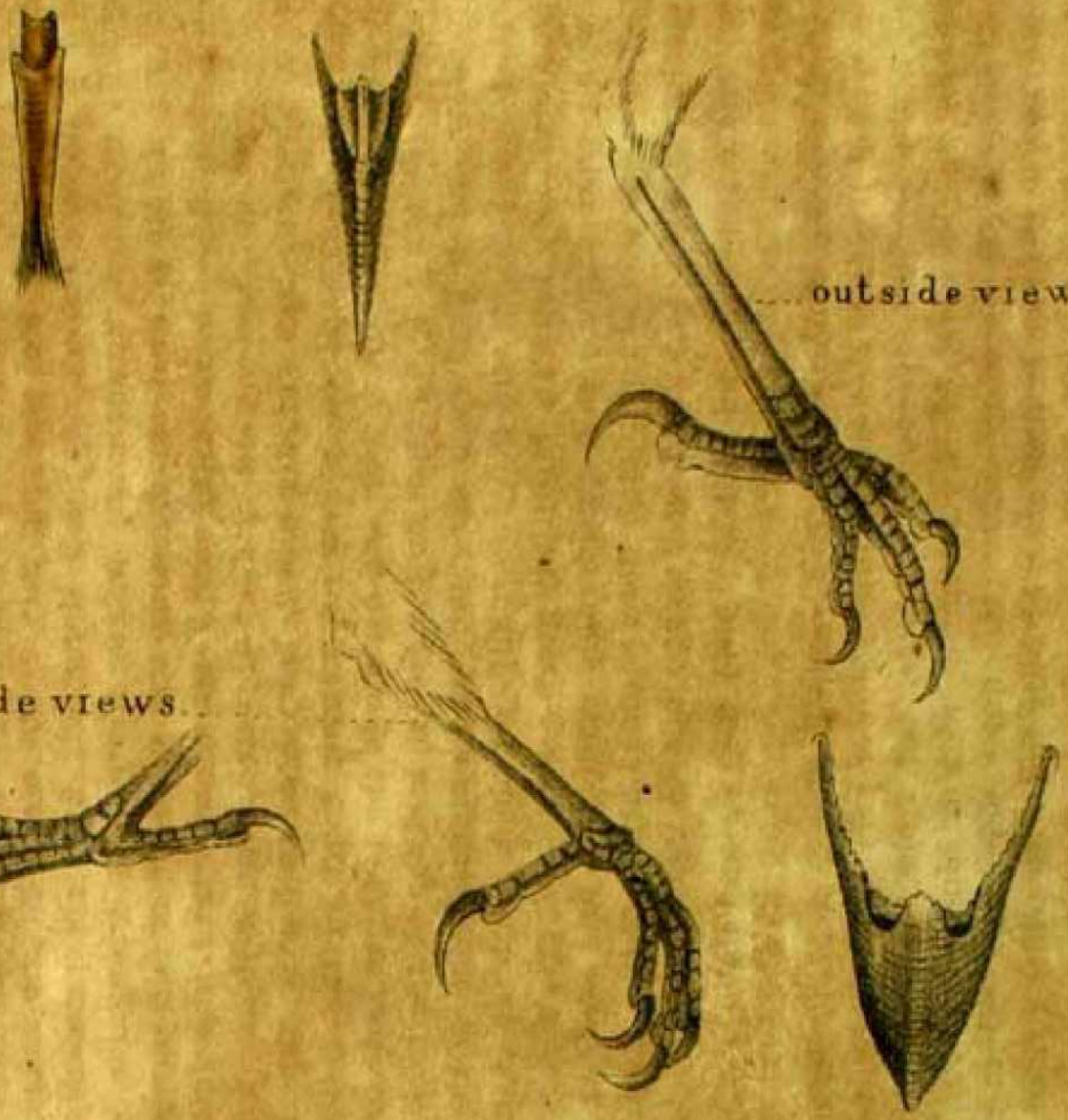
Tarsi longer than central digit, slender, smooth, more or less plumose; toes and nails as in *Eurylaimus* exactly, but the connexion of the lateral fore toes reaching only to the centre of the second and first phalanges respectively; tail elongated, firm, conspicuously and equally gradated throughout; tongue short, flat, triangular, subfleshy; the tip pointed, cartilaginous, and sub-bifid or sub-jagged. In manners, and food assimilating with *Trogon*, and with *Rucia (nobis)*.

1st. Species. *Sericeogula*. Silken-throated *Ray, nobis*. Parrot-green, changing into verditer blue below; head and neck, superiorly, black; inferiorly, silken yellow; a narrow band of the latter colour circling round the brows, and bottom of the neck, so as to enclose the black colour; a blue spot on the crown, and top of the back, and a yellow one behind each ear; tail, and external edge of the primaries blue; wings and tail, internally, jet black; orbitar skin yellow; iris hoary brown; bill lively green; legs dull greenish or yellowish; crest vague; tail considerably elongated, and wedged; the gradation equal, and complete; tarsi plumed at top only; 11 inches long by 13 wide, and $2\frac{1}{2}$ oz in weight; bill $1\frac{1}{8}$ inch; tail $5\frac{1}{2}$; tarsus $1\frac{1}{4}$; central toe $\frac{13}{16}$, and nail $\frac{5}{16}$; hind toe, $\frac{8}{16}$, and nail $\frac{6}{16}$. Sexes alike.

2nd. Species. *Rubropygia*. Red-rumped *Raya, nobis*. Structure less typical; colour slatey grey blue; lower part of the back, tertiaries, and upper tail coverts, red; wings, tail, tibiæ, and a band from the eyes to the nape, black; primaries with a blue speculum, and blue tips; the latter margined on the inner side with white; rectrices, except the two central ones, broadly tipt with white; head conspicuously crested; tail shorter, and rather rounded than wedged; tarsi half plumed; bill soft blue; iris brown; orbitar skin, orange; feet greenish; size 7 to $7\frac{1}{2}$ inches by $10\frac{1}{2}$ to 11, and $1\frac{1}{4}$ to $1\frac{1}{2}$ oz; bill $\frac{14}{16}$ inch; tail $3\frac{1}{4}$; tarsus $\frac{15}{16}$; central toe $\frac{11}{16}$; hind toe $\frac{6}{16}$. Sexes alike.

Nepal, May, 1836.

The genus Sibia nobis



The genus Raya nob.

ART. V.—*Description of two new Species of a new form of Meruline Birds.* *By* B. H. HODGSON, ESQ. *Catamandu.*

Merulidæ philedones, Cuvier.—*Merulidæ crateropodinæ?* Swainson.—*Tenuirostres meliphagidæ*, Vigors.

Genus—new, *Sibia nobis. Sibya* of the Nipalese. *Habitat.* Lower and central regions of the hills.

What shall we say to a Meruline form compounded of the bill and tongue of *Chloropsis*, the nares of *Cinnyris*, and the wings, tail, and feet of *Cinclosoma?* for such is the general, though not the precisely accurate, indication of the form I am about to describe.

Cuvier has separated from the promiscuous heap of the Meruline Birds a group which he tells us is distinguished from the *Merles* by a slenderer, sharper, and more arched bill, and by a brushed tongue. To this Cuvierian group my birds unquestionably belong; but the group itself is so large, and its contents have been so little accurately ascertained, that small way is made to a definite conclusion by the determination of that point. There are a vast number of the aberrant Thrushes, both short legged and long, which closely approximate by the bill and tongue towards the *Tenuirostres;* but I am nevertheless of opinion that these relations are of secondary, not primary, importance. The birds in question are Thrushes, as Cuvier considered them to be; but whether or not they can be, most of them, ranged with propriety among the *Brachypodinæ* and *Crateropodinæ* of Swainson, I know too little of his general system to enable me to judge.

It may serve to illustrate the character of our birds to say, that they appear to me to belong to the latter sub-family, serving in many respects to link together the two. Mr. Swainson considers the long-legged Thrushes to be equivalent to the *Tenuirostral Promeropidæ*. It is certainly remarkable that in one of our species we have the long, broad, and gradated tail of *Promerops*.

Genus—SIBIA NOBIS.

Generic character.—Bill and tongue as in *Chloropsis;* but the bill more depressed and more keeled towards the base; and the tongue forked as well as brushed. Nares basal, lateral, elongated, pervious, lunated, and almost lineated by a large, soft, sub-arched and nude membrane.

Nareal bristles, none; rictal, small; frontal plumes smooth; wings, medial, round, acuminate, firm; fifth and sixth quills longest; first and second considerably, third and four trivially, gradated; primaries plus tertiaries nearly one inch; tarsi elevate, stout, nearly smooth; toes submedial, simple, stout; fores compressed, hind depressed and large;

lateral fores and hind subequal, last strongest; nails stout, moderately curved, acute; tail various, as in *Promerops* or in *Cinclosoma*.

Species 1st. *Pieaoïdes*. Pie-like *Sibia mihi*. Saturate slatey-blue; paler and greyer below; darker and merging into black on the wings and tail; speculum on the secondaries, and tips of the rectrices, white; legs plumbeous; bill black; iris sanguine; tail very long, and gradated conspicuously and equally throughout; head not crested; 14 inches long and as many wide; bill $1\frac{1}{8}$ inch; tarsus $1\frac{1}{4}$; central toe $\frac{3}{4}$; hind toe $\frac{9}{16}$; its nail $\frac{7}{16}$; tail $8\frac{1}{2}$; weight $1\frac{1}{2}$ to $1\frac{3}{4}$ oz. Sexes alike.

Species 2nd. *Nigriceps*. Black-capt *Sibia mihi*. Rusty, with the entire cap and the wings and tail, internally, black; central wing coverts white toward their bases, slatey toward their tips; outer webs of the primaries slatey-grey; of the secondaries and tertiaries, slatey; the last, rusty, like the body; two central rectrices con-colorous with the body towards it, then black; the rest wholly black, and all with broad slatey points; bastard wing black; legs fleshy brown; bill black; iris brown; tail moderately elongated, gradated only in the six laterals; head with a full soft garruline crest; outer web of the secondaries rather enlarged, discomposed, and curled downwards; size $8\frac{1}{2}$ to 9 inches, by $10\frac{1}{2}$ to 11, and $1\frac{1}{2}$ oz. in weight; bill 1 inch; tarsus $1\frac{5}{16}$; central toe $\frac{10}{16}$, and nail $\frac{4}{16}$; hind toe $\frac{7}{16}$, and nail $\frac{6}{16}$; tail $4\frac{1}{4}$. Sexes alike.

3rd. Species. *Nipalensis, nobis*. Described already as a *Cinclosoma*,[1] and forming a singular link of connexion between the *Cinclosomæ* and the *Sibiæ*. I postpone what I have to say upon the habits and manners of these birds to a future opportunity; at present it must suffice to observe, that they are indissolubly linked to the *Meruliдæ* by the nature of their food and manner of taking it.

Nepaul May, 1836.

ART. VI.—*On the Egyptian system of Artificial Hatching. By* DON SINBALDO DEMAS.

Several unfruitful attempts have been made in different parts of Europe since the labours of Reaumur to introduce the artificial mode of hatching eggs. In some parts chickens have been brought forth which have not propagated; in others, for instance in Aranjuez, instead of chickens, hard eggs have been made. Notwithstanding these failures, being persuaded that they proceeded rather from ignorance on the part of the experimentalist than from any real or insuper-

1 Note.—As Soc. Transac. Phy. Class, vol. xix. p. 143.

able obstacle in the nature of the country where the experiments were performed, since my arrival in Egypt I determined to study in person minutely all the proceedings, without trusting to accounts which would always leave me uncertain of the truth. The enterprize was by no means an easy one. Few in Egypt possess the art, and those few make a secret of it. Besides, this first difficulty vanquished, so much patience and perseverance is necessary to remain for 21 days in an oven at 34° of Reaumur, full of the pestiferous smoke of burning dung—contending incessantly with the stupidity and prejudices of the Arabs, who always suspect some sinister motive, and to every thing oppose difficulties, (believing, among a thousand other follies, that the thermometer warms the room in which it is introduced,)—that no traveller before me, that I am aware of, has examined the matter in a satisfactory manner, or has given a circumstantial description of it. Nevertheless, my intimacy with my countryman Gaityany Bey, who rendered me every facility which the Government could offer, my knowledge of the vulgar Arabic language, and my constitution of the south of Europe, enabled me to overcome all the obstacles which hitherto embarrassed all Europeans who attempted to investigate this subject.

Before entering on a description of the process, I will stop a moment to shew that the artificial hatching, practised from time immemorial in Egypt, is not only a curious fact, but an eminently useful one; since it facilitates with surprising rapidity the reproduction and abundance of the fowl, as well as the egg; both of which may be reckoned among the most pleasing and salutary articles of food for man.

The operation is carried on in an oven, generally composed of eight divisions or cells. In each of them 6000 eggs are hatched every 21 days, for the space of 3½ or 4 months. It is admitted that Egypt contains more than 200 of these ovens. Deducting one quarter of the eggs which may be lost, we shall see that this artificial hatching gives 37½ millions of chickens in one third of the year; which again must produce an immense number of eggs.[1] Thus it happens that although latterly the price of all provisions has been doubled in that country, I have bought in Upper Egypt one egg for half a *para*, and the best fowl for a *piastra*.[2] It is to be considered also, that the power of establishing these ovens is given by Government to the highest bidder; and that from this circumstance a considerable revenue is received, which cannot fail to raise the price of the article.

1 In the *Encyclopædia Britannica* the number of ovens is stated to be 360; and the chickens produced 92 millions; which I think at least in the present day is a very exaggerated calculation.

2 One Company's rupee=10 piastras. 1 piastra=40 paras.

To produce 27½ millions of chickens without artificial heat, at least two millions of productive hens would be required in the space of four months!

The artificial mode of hatching does not oppose any obstacle to the natural one, since a hen born by means of the oven, or under the wings of the mother, at every season of the year can as well in Egypt as in any other country cover and hatch its own eggs.

One great inconvenience has been attributed to this method—it is said that the fowl degenerates, and consequently its egg.

This opinion originated in observing that the fowl of Egypt is generally smaller than that of Europe. The fact is true; but I can by no means agree that it is the consequence of artificial hatching. It is to be considered, 1st, That in Egypt several animals are of smaller size than those of other countries. 2d, That the artificial hatching consisting only in applying to the egg the same degree of heat that it might receive under the hen, without changing any of the natural operations, the number of days which it employs in vivifying it, &c. there is no plausible reasons to suppose that the chicken does not under this process attain its natural size. 3d, That there is in some parts of Upper Egypt a large kind of fowl called *bigany* or *dinderany*, and its eggs placed in the oven produce fowls equal in size to the mother. 4th, and to me the most convincing argument of all—if the action of fire could so reduce the fruit of the egg during its development, other circumstances being the same, the same cause must continue to operate every year, and small as this annual diminution may be considered in the number of ages that this method has been practised, (we find artificial egg hatching mentioned by Herodotus,) the fowl of Egypt ought to be reduced by this time to the size of a fly at least. Lastly, even admitting the hypothesis of degeneration, we must admit that the decrement has operated in a very slow and imperceptible manner. This diminution being so inconsiderable, can by no means neutralize the beneficial results of artificial hatching.

The economy and benefit that this method is capable of diffusing among those who practise it being sufficiently demonstrated, I will proceed to give a circumstantial narrative of all the steps of the operation, as I have seen it practised in the ovens established in Ghisa, a suburb of Cairo, situated upon the right shore of the Nile.

The building is composed of a corridor with vaulted roof 40 feet long and 5 broad (A B C D, fig. 1st) The vaulted roof has five small apertures to give light. In the centre, to the right hand, there is a door of 3½ feet high and 2½ broad (E, fig. 1st); this leads to another corridor (F G H I, fig. 1st) 48 feet long by 5 broad, also with vaulted

roof, in the centre of which there are three apertures (J K L, fig. 2nd) of nine inches in diameter, to give light from above; to the right and left hand of the corridor there are five divisions or cells of two stoves. Each inferior room or stove has an aperture of 1½ feet square (M, fig. 2nd). The superior room has another aperture above of two feet five inches in height, and one foot nine inches broad (N, fig. 3rd); it has also an aperture of one foot square in the wall of the right hand, and another of equal size in the left, which I have seen constantly stopped up with tow (d, fig. 4th). The walls of the said upper stove begin rectangular from the ground, finish in a vault of 6½ feet high (O, figs. 3rd and 4th), with a hole in the top of nine inches diameter (P, figs. 3rd and 4th). The ground of this room is nine feet long and eight broad (X Z V U, fig. 5th) and has in its breadth, that is to say in the same direction with the corridor, two grooves (Q Q, R R, fig. 5th.) of nine inches broad and two deep, and in the centre an aperture almost round of two feet in diameter (S, fig. 5th). The first room entering to the right hand is destined to keep a fire always kindled; it has only one stove, and its door is larger than the others (T, fig. 2nd). The first room to the left hand has no hole in the ground of the upper stove, but only a fissure of two feet, which separates the ground from the interior of the wall, to which it is notwithstanding united by several iron bars in the form of an oblique grate, (b, fig. 6th.) In this cell the materials destined for combustion are thrown through the hole in the top. They pass through the grate as through a sieve, and are taken away by the inferior aperture to be transported to the opposite cell which contains the magazine of fire.

There are, lastly, to the left hand of the exterior corridor two rooms 15 feet square, with vaulted roofs of 12 feet high, with an aperture in the top; they are intended for the preparation of eggs, as well as a place for chickens recently born, &c. (f and g, fig. 1st).

The material for constructing the oven, is the same employed generally in Egypt for the houses of the peasants; that is to say, mud mixed with straw. The vaults are constructed with burnt bricks. The ground which divides the cell in two stoves is sustained upon two trunks of palm trees parallel to the corridor, and a bed of branches of the same tree supported by the said trunks. Upon this entablature is spread the mud which forms the ground whereon the fire is placed.

A little straw or tow is prepared on the ground of the inferior room; upon it a mat is placed, and upon the mat 6000 eggs,

which are not more than twenty-one days old, taken from a hen-yard in which there is a cock.

For combustibles the dry dung of animals is used, which the Arabs reduce to small pieces with their hands; this material they call بيمس *(dims)*. In the first room to the right hand two pyramids of burning *dims* are formed, covered with common earth. The *dims* must take fire slowly, without making a flame. It is taken up with a fire shovel, put on to a plate of baked earth, and afterwards placed in the grooves (Q Q, R R, fig. 5th) which have been first half-filled with cold *dims*. Again a little *dims* is placed upon the burning portion, and upon the whole a little earth is strewed. The burning *dims* which is taken from the magazine is continually replaced with an equal quantity of cold material.

On the morning of the day destined to begin the operation the fire is placed in the cell to warm it, and at sunset the 6000 eggs are disposed in the manner explained. The fire is renewed three times a day—at dawn, at midday, and at sunset; there is however no very religious exactitude observed in this. If the fire put on in the evening is yet alive at the dawn of the subsequent day, it is left, and is not renewed till midday. In one instance, which I saw, being ready about 12 o'clock to put on the fresh fire, a quarrel happened, and it was not put on till 3 o'clock. At sunset it was not renewed, and this *dims* lasted till the dawn of the subsequent day.

When the new fire is put on, the door of the superior stove is left open, also the hole of the vault, and if the fire is too strong, even the small door of the inferior stove. The aperture in the ground of the superior stove is always covered, as well as the two apertures in the walls to the right and left hand. When the heat begins to mitigate and the smoke to disappear, all the small doors of the inferior stove are stopped up, afterwards the hole at the top of the vault, and lastly the door of the superior stove, which is not generally stopped. The doors of all these apertures are merely handsful of tow for each. When the fire is recent, and the heat at its greatest strength, the thermometer marks 33° or 34° of Reaumur. When the fire is extinct, and before it is renewed, the heat is 30° sometimes as low as 29°.* Six or

* *Reaumur. Fahrenheit. Centigrade.*

24	=	86	=	30
28	=	95	=	35
32	=	104	=	40
36	=	113	=	45

seven times every twenty-four hours the operation that I am going to describe is practised.

A man entirely naked enters by the door (N, fig. 2nd); he either carries a light in his hand or he opens the hole of the vault to procure light; he opens also the round hole in the centre of the ground, and comes down through it to the inferior stove. He carries all the eggs placed on the side V fig. 7th to the side U; and those of the side U to the side V. The eggs placed under the central hole are found sensibly colder than those placed at V and U, and these latter not so warm as those of the sides X and Z. Generally they are heaped toward the corners. This operation is very necessary not only to apply the heat to all the points of the egg, but to apply it in the same proportion to all the eggs, so that development may not be effected sooner in one than in another. This removing of the eggs is performed during the day, and several times during the night. Thus the affair proceeds till the 7th day. On this day, as on the 8th, the whole of the groove before the door R R, fig. 5th, is not filled with fire, but only 2 or 2½ feet near the entrance. By these means the heat is diminished gradually; and during these two days the thermometer at its greatest height marks only 32° or 31° of Reaumur. After the 8th day fire is no longer placed in the room. We should naturally expect that the cell unprovided with fire would return to the natural temperature of the surrounding air, but it is not so. We have already said that in the oven there are eight cells destined to the process of hatching. Three or four days after that on which the eggs have been put in the first room, they are placed in the second, and so on successively. The consequence is, that though one or two cells may be without fire, the others contain it; besides which fire is always burning in the chambers wherein the fuel is prepared, the door of which is never stopped, while its temperature ranges from 36° to 38°. All these fires produce a degree of heat which diffuses itself through the whole building, and maintains even in those rooms which are without fires a temperature varying from 27° to 27½°. On the 14th day another operation is performed. Half the eggs are left in the inferior room (fig. 8th) and the other half are brought to the upper one upon a circular bed of tow (fig. 9th); in this way they continue wrapping them up two or three times a day, but without bringing down those from above, or carrying up those from below. To this operation of dividing the eggs they do not attach much importance. During my observations of the operation, this division was not executed till the 16th day, because they had no tow ready to prepare the circular bed with. When the eggs are divided, the man does not enter again through the

door of the superior stove, but through that of the inferior one, arranging the eggs below; afterwards standing up he pushes his head and arms through the hole of the roof, and arranges those above.

The eggs which have not been in the oven eight days they call صري *(el tari) the fresh.* I have eaten some of them after two or three days baking, and they were good. Towards the sixth or seventh day, they look at them before a light. If the egg appears opaque and obscure, it is inferred that the operation will succeed; on the contrary, if it is transparent and white, they conclude that the chicken will not be formed. The people who keep the oven eat these eggs or sell them. They have the appearance and taste of boiled eggs. Those which go on without fire after the eighth day they call ملوح *(meláh) the good.* Lastly, those which have continued more than twelve days in the cells they call المسكوا *(el mésku) which has taken*; or that wherein the chicken is already formed. The cells where eggs are divided half below and half above, as they are placed after the fourteenth day, have their doors constantly stopped with great care. During the last days of the process the hole of the top of the vault is not only stopped with tow, but with a great deal of earth upon the tow. Four or five days before the end of the operation, the door in the upper stove being open, as well as the hole of the vault, the thermometer indicates 26°, the hole being stopped 27½°, and the door being stopped 27°. Two days before the birth of the chicken, being all well stopped, the temperature reached to 28°, and the day before to 28½°. At the moment that the chickens are coming to life the heat is 28½°; and in the inferior stove, in which there are about a thousand recently born, 30°; an augmentation which proceeds no doubt from the animal heat of the young birds, since there is no fire in the room, nor has there been any in it for thirteen days.

It is also curious to observe that the temperature varied during the last few days; this probably is the effect of the animal heat which begins to develope itself in the inside of the eggs.

If we reconsider all the facts I have detailed, we shall see that the hatching of which we are speaking, consists only in applying to the egg equally and regularly during twenty-one complete days, a degree of heat which beginning with 33° or 34° of Reaumur, falls to 27½° or 27°, and rises again to 28° or 29° with the help of the animal calorie, produced by nature in the process of hatching.

As soon as the chickens are born, the egg-shells are thrown away. The eggs of the inferior stove are carried to the upper, and the chicken to the inferior, which is reserved for them. These are treated with

very little care. They take them up in handsful and throw them below. Here they remain till the subsequent day, on which they are draw out to the corridor, where they pass some hours; sometimes one whole day. After this they are carried in covered baskets to particular houses, as will be explained, where they begin to eat ground corn or hard eggs. During the day they are exposed to the sun; before sunset they are carried to a room to be sheltered from the cold. The Arabs *never* help the chicken in breaking the egg-shell.

During the hatching at which I was present, the natural temperature in the shade varied from 13° to 16°; the day on which the chickens were born it was 16°, and the thermometer exposed to the sun about midday marked 29°. On the subsequent day, under the same circumstances, it rose to 33½°. The weather was always perfectly fair excepting the fifteenth day, on which a little rain fell during the night. All the apertures were on that occasion well shut up, and the dampness produced no bad effects.

I have always placed the thermometer in the upper stove (n. fig. 3) in which the fire existed. That which served me for these observations compared with others of Reaumur's, was found to be rather lower than these.

The oven in which I studied this description, began its labours on the 2d of February last. Generally they begin fifteen or twenty days later. The hatching season closes in the month of June at the latest.

In the midst of summer the sun is more powerful, and the eggs more abundant and cheap. Why, then should this operation be practised in the spring?

To give a satisfactory answer to this objection, there must be facts of which I am not possessed, never having had either opportunity or time to set one of the ovens in operation during the hot season. However I am fully convinced in my own mind that spring is the season best calculated for this operation in Egypt, according to the present mode of working; for the first inventors of these ovens would not have fixed upon this season but through experience, having no doubt made repeated trials.

Where facts are wanting, conjectures founded on observations and reason, may frequently in a great measure supply the deficiency; I shall therefore state what I conceive to be the reasons for giving spring the preference to summer in the lighting of the ovens.

1. During the spring months a hot southerly wind prevails, which ceases at the commencement of summer, yielding to a strong, cold, northerly one; this fills the whole atmosphere with dust and fine sand, of which there is such abundance in Egypt; it is therefore im-

possible that the little tender chickens just hatched should be able to withstand the inclemency of such weather; whereas if hatched in spring, they become strong enough before summer sets in.

2. The great difficulty of collecting a sufficient quantity of fresh eggs during the summer, must be a decided objection for putting them into the ovens at that time, for in five or six days all the eggs become spoilt, and it takes some time to gather the required number of eggs; indeed this is the reason which the natives themselves assign when questioned on the subject.

Whatever may be the weight attached to these opinions, yet the very circumstance of this artificial hatching being practised in spring furnishes us with a strong proof that its introduction not only in hot but in temperate climates is feasible.

In this firm conviction, and with the anxious desire of its adoption in other countries with success, I shall venture to offer a few remarks which I trust will be profitable.

Without waiting to shew the different modifications and improvements of which the Egyptian ovens are capable, I shall only mention that the system of large ovens is subject to many inconveniences.

1. This work becomes a monopoly to a few, and Government consequently levy a tax on the establishment.

2. The collecting of so many thousand fresh eggs becomes a work of labour and expense.

3. Taking care of the newly-hatched chickens would be attended with immense trouble and loss; for at sunset they must be placed in a warm room, their food and drink must be attended to, and cleanliness, and other little cares, must not be neglected to rear them, whilst the oven-keeper must be looking after more fresh eggs to continue his subsistence. In fact, these serious inconveniences have been felt and remedies adopted.

In some districts people bring eggs to the ovens on their own account; these they mark with ink or otherwise, and pay the proprietor for the use of the oven and his superintendence, taking the chickens away when hatched.

In other districts Government allot six or eight villages for the exclusive use of the oven-proprietors, to whom alone the villagers must sell the eggs. In this case the proprietor farms out a certain number of chickens to several poor families, either paying them when the fowls are sold for the trouble of rearing them up, or receiving back generally one half for the number of chickens given; the persons taking as many above that number as they may have succeeded in rearing, as a compensation for their trouble.

A small oven worked by a single family on their own risk and profit, would be free from these inconveniences, and no doubt would remunerate them for their labour and expense.

An oven for that purpose ought to be of a rectangular shape, made of baked clay, 3 feet high and 3 feet broad, and from 4 to 6 feet long, with a double roof, so that the fire might be spread evenly on the whole. The lower roof should have a hole to allow of the heat passing into the oven where the eggs are. The upper roof must have an aperture for the smoke to issue, and if necessary to lessen the heat, and also for the purpose of introducing a thermometer. This aperture should be made like the lid of a box to lift up, for the greater convenience of removing the ashes, and renewing the fire; one of the walls of the oven should be made to open to admit of the hands being introduced to remove and shift the position of the eggs.

This oven moreover must be kept in a closed room, out of the way of any current of air; while the room where the oven is placed would be further useful for keeping the newly-hatched chickens till they gain strength.

Perhaps it would be an improvement if the oven were made with a double wall an inch or two apart, and the space filled up with some non-conductor of caloric, such as cork or triturated charcoal.

I think that any potter could make such an oven for the sum of five or ten shillings, and that this artificial hatching might thus be carried on in almost every country house, on a small scale, at all seasons of the year, particularly summer, with successful results. A high temperature must of course be more favourable than a low one for this process. In Egypt itself this fact is acknowledged by a common proverb among the people,

اَلكتكوت الفول ياكل ويموت كتكوت التوت ياكل ويموت
كتكوت المزمح وياكل وينفرح

"The chicken of the bean (i. e. the chicken hatched at the season of beans) eat and die; the chicken of the mulberry eat and die; but the chicken of the apricot eat and thrive." The season for beans is in February, and that of apricots in May.

Besides this, a curious circumstance once occurred which still more strongly proves that this is the best season for hatching. Three eggs were forgotten, and left in a basket in July in the house of Mr. Aime at Cairo; these were hatched spontaneously, and produced three chickens which thrived. Why should not then two or three hundred in a small oven succeed?

Before I conclude this brief account, I would just mention that this artificial mode of hatching will apply equally to turkey's eggs. Several Europeans had put them into the ovens in Egypt, and a few did succeed in being hatched, but Arabs being totally ignorant of the principles of the oven-hatching, they subjected them to the same conditions as fowl's eggs—hence the failure of the greater number. But that they might be hatched artificially was evident from some of the eggs which were put in having been hatched. By this means the supply of turkeys would also be cheap and abundant.

I have no doubt that if this artificial hatching of turkeys as well as fowls were introduced into any country, and commonly adopted in farm houses, it would tend greatly to the advantage of the land.

References to the Plate.

Fig.

1st. General plan of the oven.
2d. Section of the corridor F G H I.
3d. Section of one cell in the direction of the corridor F G H I.
4th Section of one cell in the direction of the corridor A B C D.
5th. Floor of the upper story of one cell.
6th. Floor of the upper story of the cell Y.
7th. Floor of the under story of a cell.
8th. Floor of the under story of a cell after the 14th day.
9th Floor of the upper story of a cell after the 14th day.

ART. VII.—*Report on the Mortality among Officers and Men in H. M. Service in Bengal, and on the comparative salubrity of different Stations. By the late Dr.* W. A. BURKE, *Inspector-General of Hospitals.**

To W. W. BIRD, ESQ.

President of the Committee for the Insurance of Lives in India.

SIR,

I have the honor to acknowledge the receipt of your letter, which a protracted and severe illness prevented my replying to as soon as I could have wished. I shall now endeavour as far as possible to comply with the request of the Committee in affording all the information in my power regarding mortality in the rank of officers as well as men

* For this very valuable paper we are indebted to Mr. Martin, the Surgeon to the Native Hospital of Calcutta. Dr. Burke's tabulated returns form an important addition to our knowledge of the laws of vital statistics. In connexion with this paper the reader should consult Mr. H. T. Prinsep's paper on the "Value of Life in the Civil Service."—*Journal of the Asiatic Society*, 1832, p. 277, and 1837, p. 341; and his "Table of Mortality," founded on the registers of the Lower Orphan School, 1838, p. 818.—ED.

in His Majesty's service in Bengal, and the comparative salubrity or otherwise of the different Stations for European Troops in this command.

As to the healthiness of the Stations occupied by H. Majesty's Troops in Bengal, the following abstract from their Sick Returns will serve so far, to afford the requisite information for a period of four years, as to their comparative degree of health from 1830 to 1833 inclusive.

Stations.	Period of years,	*Officers.*			*Men.*			*Women.*			*Children.*		
		Average Strength,	Died of diseases in the Station,	Proportion of Deaths to Strength per cent.	Average Strength,	Died of diseases in the Station,	Proportion of Deaths to Strength per cent.	Average Strength,	Died of diseases in the Station,	Proportion of Deaths to Strength per cent.	Average Strength,	Died of diseases in the Station,	Proportion of Deaths to Strength per cent.
Meerut, ...	4	222	3	1·35	5,900	117	1·98	722	16	2·21	1,200	59	4·91
Cawnpore, ..	4	226	7	3·10	5,950	271	4·55	914	37	4·04	1,572	145	9·22
Ghazeepore, ..	4	109	3	2·75	3,754	143	3·80	456	15	3·29	845	56	6·62
Berhampore,..	4	118	9	7·62	3,515	236	6·77	473	27	5·71	865	70	8·09
Chinsurah,....	4	119	6	5·04	2,523	154	6·10	469	28	5·96	756	28	3·70
Fort William,	4	119	7	5·88	3,097	235	7·59	447	48	10.73	761	124	16·29
Kurnaul, ...	3	81	1	1·23	2,827	85	3·00	404	7	1·73	679	45	6·62
Agra, .., ...	2	63	..	..	1,513	29	1·91	208	3	1·45	336	30	8·92
Dinapore,.. ..	2	56	1	1·79	1,612	56	3·84	189	8	4·23	299	37	12·37
Boglipore, ..	1	27	..	..	1,037	41	3·95	119	6	5·05	190	16	8·42
ChirraPoonjee,	1	..	..	..	38	6	15·79	..	..	..	..	..	..
Landour, ...	4	..	..	..	275	16	5·82	..	..	..	..	..	..
Total, ...	..	...	....	....	32,041	1,389	4.33	4,401	195	4·43	7,503	610	8·30

Among the Officers there were ten more deaths, but none of which occurred in any of the above Stations, viz.—

At Sea	2
On the River	3
At Madras	1
At Sultanpore Benares	1
At Allahabad	1
On the Hills	2

Giving the following proportions of deaths among the Officers His Majesty's service for four years, from 1830 to 1833 inclusive—

Tpfal Average strength	Total Deaths.	Total ratio of deaths to strength,
1140	47	412

Among the Men also there were other deaths, not within the scope of the foregoing Statement; in consequence of which an abstract is give to include the whole of the casualties regimentally among all His Majesty's Troops throughout the Bengal command, for the period 1830 to 1833.

REGIMENTS.	Period of years.	Strength of Command, 1st January each year.	By disease in Regimental Hospitals.	By accidents, drowned, killed, &c.	Absent Deaths.	Grand Total of Deaths.	Proportion of Deaths to Strength per cent.	Invalided.	Remarks.
11th Lt. Dragoons, ..	4	2,626	75	2	15	92	3·50	18	In the Column 'absent Deaths,' are included, Deaths absent from Regiment in General and Detachment Hospitals, and other Casualties, such as died or drowned at sea, &c.
16th Lancers, ...	4	2,488	121	12	16	149	5·83	36	
3d. Buffs, ...	4	3,138	185	13	7	205	6·53	4	
13th Lt. Infantry, ..	4	3,217	87	6	4	97	3·01	13	
14th Foot, ...	1-1	1,350	58	6	3	67	4·96	0	
16th Ditto, ...	4	3,047	199	7	9	215	7·05	20	
26th Ditto, ...	4	3,447	53	3	24	80	2·32	10	
31st Ditto, ...	4	3,925	100	18	18	136	3·72	8	
38th Ditto, ...	4	3,927	146	20	22	188	4·78	4	
44th Ditto, ...	4	3,510	135	9	5	149	4·24	11	
49th Ditto, ...	4	2,909	110	11	2	223	7·66	8	
Total, ...	0	33,485	1,369	107	125	1,601	4·78	133	

Shewing the strength and deaths, and the ratio of deaths to strength, in His Majesty's Regiments, in the Bengal command.

	Total Average strength.	Total Deaths.	Total ratio of deaths to strength per cent.
Men,.....	33484	1601	4·78.

It is to be observed that the strength of the troops in this statement is as given in the Regimental Returns on the 1st January of each year, and which differs from the mean annual strength; the latter being 32041, the ratio of total deaths to it is 4·99. In the different Stations of His Majesty's Regiments in the Presidency of Bengal, there is so little difference in the periods and duration of the seasons, as well as in their general temperature and climate, that it is upon the innate features of each Station itself, and from the data afforded by

its Returns, that its comparative salubrity would appear to be best deduced.

The steadiness or mutability of the climate, or considerable anomalies of weather, or physical properties, seem more to influence the health of the troops than either its heat or its cold, abstractedly considered.

The causes of sickness in many Stations must be traced to other sources than climate.

The soil of Bengal being composed of alluvial matter, formed by the detritus carried down by the great rivers, and accumulated for ages, there is a poison in the exhalations of such soils, the nature of which is unknown; but from it emanate all those species and varieties of fevers, (dependent on marsh miasma as their remote cause) so frequent in Bengal, and to which one general character appertains—periodicity, or remissions, and exacerbations.

A large proportion however of the cases of sickness and deaths among the European soldiers, may be more or less attributed to excesses, especially in the use of spirituous liquors.

The relative healthiness of each Station is according to the Returns, as follows, from 1830 to 1833 inclusive—

	Deaths to strength.
Fort William	7·59 per cent.
Berhampore	6·77
Chinsurah	6·10
Cawnpore	4·55
Boglipore	3·95
Dinapore	3·84
Ghazeepore	3·80
Kurnal	3·00
Meerut	1·98
Agra	1·91

There are given Classification Tables, taken from the Regimental Returns, shewing the different classes, numbers, ages, and deaths, of the soldiers of His Majesty's service in Bengal for the years 1826 to 1833, viz.

Return of the different Classes of Men, Ages and Deaths of H. Majesty's Troops serving in the Bengal Command.

1826.

Class. / Age.	11th Light Dragoons, from Bhurtpore.		16th Light Dragoons, Lancers, from Bhurtpore.		13th Light Infantry, from Ava.		14th Foot, from Bhurtpore.		31st Foot, from England.		38th Foot, from Ava.		44th Foot, from Ava.		47th Foot, from Ava.		59th Foot, from Bhurtpore		87th Foot, from Ava.		Total.		Proportion of Deaths to Strength per cent.
	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died	Number.	Died.	Number.	Died	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	
From 18 to 20 years.	21	0	6	0	111	64	41	12	102	60	91	21	196	56	144	22	231	31	72	7	1,015	273	26·89
„ 20 to 25 „	98	4	67	6	388	26	148	23	516	46	174	35	263	14	144	46	217	28	218	34	2,233	262	11·69
„ 25 to 30 „	150	15	119	2	213	23	210	49	148	23	126	44	196	46	267	30	214	20	226	51	1,869	273	14·61
„ 30 to 35 „	173	15	270	8	93	8	276	20	86	9	130	29	161	19	140	28	126	13	194	42	1,649	191	11·58
„ 35 to 45 „	113	12	169	5	57	13	244	23	37	12	90	19	110	7	83	21	141	26	234	38	1,279	176	13·76
Under 18 years, ..	12	0	1	0	15	0	3	0	14	0	22	0	31	0	23	0	61	0	0	0	182	0	0
Unknown, ...	0	0	20	0	0	0	0	0	0	0	194	0	205	0	0	0	0	0	0	0	419	0	0

1826 being the first year these Returns were required, the term "unknown," was applied to those men whose ages the Surgeons could not then ascertain, but afterwards, when ascertained, they were taken into their proper and respective classes.

1827.

Class. Age.	11th Light Dragoons.		16th Light Dragoons Lancers.		3d. Foot or Buffs.		13th Light Infantry.		14th Foot.		31st Foot.		38th Foot.		44th Foot.		47th Foot.		59th Foot.		Total.		Proportion of Deaths to Strength per cent.
	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died,	Number.	Died.	Number.	Died.	
From 18 to 20 years,	20	2	5	0	46	12	137	24	22	8	114	12	99	23	198	11	94	6	189	10	924	108	11·69
„ 20 to 25 „	134	8	66	16	184	29	464	35	141	8	435	20	297	29	425	21	362	24	326	8	1,581	178	11·25
„ 25 to 30 „	117	10	123	10	86	28	197	13	165	13	262	10	184	27	223	10	255	19	199	11	1,811	151	8·34
„ 30 to 35 „	168	11	260	12	77	16	88	3	272	15	87	6	211	12	175	5	113	14	130	5	2,834	99	3·49
„ 35 to 45 „	144	4	166	6	84	18	58	4	247	19	81	9	122	20	114	1	74	12	104	7	1,194	100	8·37
Under 18 years, ..	16	0	1	0	0	0	14	0	8	0	13	0	21	0	37	0	13	0	29	0	152	0	0
Unknown, ...	1	0	20	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0	0	53	0	0

1828.

CLASS.	11th Light Dragoons.		16th Light Dragoons Lancers.		3d. Foot or Buffs.		13th Light Infantry.		14th Foot.		31st Foot.		38th Foot.		44th Foot.		47th Foot.		59th Foot.		Total.		Proportion of Deaths to Strength per cent.
Age.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	
From 18 to 20 years.	16	2	2	0	52	5	35	16	19	3	62	4	86	8	98	6	88	2	181	4	639	50	7·82
„ 20 to 25 „	140	25	90	10	282	25	469	35	167	10	512	18	299	27	486	23	353	16	298	21	3,106	210	6·76
„ 25 to 30 „	124	15	93	8	133	19	200	27	155	7	285	22	180	20	213	8	243	25	178	11	1,804	162	8·98
„ 30 to 35 „	149	11	168	17	112	26	108	7	251	12	81	7	146	3	164	4	105	8	124	4	1,408	99	7·03
„ 35 to 45 „	159	11	217	11	120	19	57	11	261	28	89	10	129	13	117	3	67	7	97	5	1,313	118	8·98
Under 18 years, ..	17	0	6	0	3	0	19	0	4	0	8	0	13	0	17	0	13	0	21	0	121	0	0
Unknown, ...	0	0	0	0	49	0	0	0	0	0	5	0	0	0	23	0	0	0	0	0	77	0	0

1829.

Class. Age.	11th Light Dragoons.		16th Light Dragoons Lancers.		3d. Foot or Buffs.		13th Light Infantry.		14th Foot.		16th Foot.		31st Foot.		38th Foot.		44th Foot.		49th Foot.		Total.		Proportion of Deaths to Strength per cent.
	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number	Died.	Number.	Died.	
From 18 to 20 years.	5	2	2	2	53	7	13	9	3	0	22	9	3	2	48	0	22	4	39	3	210	38	18·09
„ 20 to 25 „	122	12	148	41	390	26	413	50	140	5	98	16	535	24	386	20	497	15	199	14	2,927	223	7·62
„ 25 to 30 „	140	9	107	5	129	28	202	32	150	7	127	18	329	10	236	13	193	8	200	26	1,813	156	8·60
„ 30 to 35 „	146	5	123	4	142	6	118	10	256	5	169	6	84	3	129	6	153	4	188	35	1,508	84	5·57
„ 35 to 40 „	150	8	214	14	153	6	52	8	271	19	405	9	90	2	137	8	131	2	87	29	1,490	105	7·04
Under 18 years, ..	16	0	12	0	9	0	19	0	5	0	10	0	14	0	6	0	14	0	7	0	112	0	0
Unknown, ...	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	18	0	0	0	20	0	0

1830.

Class.		11th Light Dragoons.		16th Light Dragoons Lancers.		3d. Foot or Buffs.		13th Light Infantry.		1st. Foot.		16th Foot.		20th Foot.		31st Foot.		38th Foot.		44th Foot.		49th Foot.		Total.		Proportion of Deaths to Strength per cent.
Age.		Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	
From 18 to 20 years.		60	0	25	2	17	1	166	0	159	0	26	1	36	1	12	0	55	0	400	0	12	1	972	6	0·62
20 to 22	"	61	2	32	5	82	5	165	2	0	0	111	3	132	1	131	3	114	8	0	7	204	6	1,052	47	4·47
22 to 24	"	120	6	121	1	195	8	131	8	0	0	119	9	224	0	149	4	256	9	0	8	109	8	1,427	67	4·69
25 to 30	"	191	5	127	2	258	16	144	12	0	0	207	18	306	7	475	10	353	10	412	11	155	22	2,668	123	4·60
30 to 35	"	142	5	114	5	149	9	120	2	382	35	145	16	110	1	130	3	135	6	97	6	246	10	1,770	96	5·53
35 to 45	"	50	5	221	11	131	2	68	2	87	7	207	17	94	6	132	0	152	6	89	5	44	3	1,225	66	5·36

1831.

Class.		11th Light Dragoons.		12th Light Dragoons. Lancers.		3d. Foot or Buffs.		13th Light Infantry.		16th Foot.		29th Foot.		31st Foot.		38th Foot.		44th Foot		49th Foot.		Total.		Proportion of Deaths to Strength per cent.
Age		Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	
From 18 to 20 years.		24	0	4	0	13	0	165	0	11	0	99	0	1	0	47	0	380	0	16	0	723	0	0
20 to 22	"	82	2	6	1	22	4	194	3	136	1	103	2	26	1	175	1	0	0	40	3	86	22	0-48
22 to 24	"	129	4	30	2	124	11	131	6	119	15	183	6	111	4	214	11	0	0	49	6	1,145	38	0-62
25 to 30	"	182	12	304	4	361	23	156	19	205	15	389	10	402	19	272	21	379	5	321	31	3,026	120	2-34
30 to 35	"	150	4	95	6	161	7	80	6	111	11	83	4	146	6	154	9	114	7	222	17	1,264	36	5-05
35 to 40	"	55	12	225	10	135	11	24	8	88	12	62	3	140	4	160	13	36	6	58	10	1,154	64	6-01
Unknown,	"	0	0	25	0	0	0	0	0	0	0	0	0	0	0	14	0	5	0	0	0	51	0	7-86

1832.

Class. Age.	11th Light Dragoons.		16th Light Dragoons Lancers.		3d Foot or Buffs.		13th Light Infantry.		16th Foot.		26th Foot.		31st Foot.		38th Foot.		44th Foot.		49th Foot.		Total.		Proportion of Deaths to strength per Cent.
	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	
From 18 to 20 years	13	1	15	0	9	0	141	0	4	1	7	0	94	0	5	1	178	1	16	1	482	5	1·04
,, 20 to 22 ,,	55	1	26	0	33	1	195	1	10	2	118	2	109	0	93	0	5	1	71	0	715	8	1·11
,, 22 to 24 ,,	155	1	85	3	65	7	124	0	83	7	236	5	126	1	95	5	1	4	92	6	1062	39	3·67
,, 25 to 30 ,,	238	4	214	6	310	33	157	9	189	12	207	9	131	31	383	19	319	11	240	19	2438	153	6·27
,, 30 to 35 ,,	161	2	87	4	159	16	73	1	136	5	124	5	254	10	183	5	302	8	176	10	1655	66	3·99
,, 35 to 45 ,,	26	12	229	13	167	15	73	0	209	14	105	1	56	8	199	6	50	1	115	6	1329	76	5·71
Under 18 years. ..	3	0	13	0	0	0	11	0	0	0	9	0	9	0	12	0	5	0	0	0	62	0	0

1833.

Class. Age.	11th Light Dragoons.		16th Light Dragoons Lancers.		3d Foot or Buffs.		13th Light Infantry.		16th Foot.		26th Foot.		31st Foot.		38th Foot.		44th Foot.		49th Foot.		Total.		Proportion of Deaths to strength per Cent.
	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	Number.	Died.	
From 18 to 20 years.	15	0	10	0	107	1	146	1	4	0	6	0	13	0	5	0	73	0	16	0	395	2	0·50
,, 20 to 22 ,,	112	1	20	3	98	0	173	0	10	0	12	1	11	0	111	0	218	1	20	0	785	6	0·76
,, 22 to 24 ,,	64	0	49	10	82	2	131	0	90	1	81	1	9	1	93	0	204	2	63	6	866	23	2·65
,, 25 to 30 ,,	123	3	206	25	99	20	135	13	209	22	389	11	676	19	298	25	126	24	260	22	2512	184	7·32
,, 30 to 35 ,,	133	1	82	4	195	8	76	3	138	9	164	1	147	3	175	16	121	8	185	23	1414	76	5·37
,, 35 to 45 ,	179	8	191	30	113	5	70	4	217	15	115	3	39	9	200	16	61	10	103	13	1288	113	8·77
Under 18 years. ..	3	0	10	0	7	0	9	0	14	0	7	0	10	0	9	0	4	0	0	0	73	0	0

General Abstract of the foregoing Returns, giving the Ratio of Deaths of each class for 8 years.

Class.	1830.	1831.	1832.	1833.	Average proportion from 1830 to 1833.	1826.	1827.	1828.	1829.	Average proportion from 1826 to 1829.	Mean average proportion for 8 years.
From 18 to 20 years.	0·62	0·14	1·04	0·50	0·58	26·89	11·69	7·82	18·09	16·12	8·35
,, 20 to 25 ,, ...	4·58	5·07	2·39	1,71	3·44	11·69	1·125	6·76	7·62	9·33	6·39
,, 25 to 30 ,, ...	4·60	5·25	6·27	7·32	5·86	14·61	8·34	8·98	8·60	10·13	8·25
,, 30 to 35 ,, ...	5·53	6·01	3·99	5·37	5·22	11·58	3·49	7·03	5·57	6·92	6·07
,, 35 to 45 ,, ...	5·38	7·28	5·71	8·77	6·78	13·76	8·37	8·98	7·04	9·54	8·16

The General Abstract of the foregoing shews that for the four first years, viz. 1826-27-28 and 29 the ratio of deaths is,

From the age of 18 to 20 years 16·12 per cent.
" 20 to 25 " 9·33 "
" 25 to 30 " 10·13 "
" 30 to 35 " 6·92 "
" 35 to 45 " 9·54 "

For the four last years, viz. 1830-31-32 and 33, the ratio of deaths is,

From the age of 18 to 20 years 0·58 per cent.
" 20 to 22 " 2·24 } 3·44
" 22 to 24 " 4·63 }
" 25 to 30 " 5·86
" 30 to 35 " 5·22
" 35 to 45 " 6·78

There will be observed a striking difference between the ratio of deaths in each class of the two periods of four years; viz. first, from 1826 to 1829, and, second, from 1830 inclusive. But there is to be taken into consideration, that in the first period there are included the casualties (in 1826) of the Troops His Majesty's service who had been in active service at Bhurtpore, Ava, and Arrakan. During the campaigns, in the latter places especially, the deaths from disease among the young soldiers recently arrived in India, was very great.

Thus in the 13th Regiment Light Infantry, that had arrived in India in May 1823, and was composed chiefly of young soldiers, the mortality was,

	Strength.	Deaths.	Proportion.
At Bengal from May to December, 1823	653	45	6·89 for 8 months
At Ava in 1824	608	231	37·99
Do. do. 1825	377	115	30·50

In the 38th Regiment, which arrived in Bengal in May 1823, the mortality was,

	Strength.	Deaths.	Proportion.
In 1822 in Bengal	743	94	12·65 per cent.
In 1823 do.	695	52	7·48
In 1824 in Ava	643	185	28·77
In 1825 do.	458	162	35·37

In the 44th Regiment, which arrived from England in November 1822, the mortality was,

	Strength.	Deaths.	Proportion.
In 1823 in Bengal	661	73	11·43 per cent.
In 1824 at Chittagong and Arrakan	588	88	14·96
In 1825 at Arrakan	500	203	40·60

There is a difference however in the mortality of young recruits of Regiments when on active service, and the contrary; as, for example, in the 13th Light Infantry, which in 1826 in Bengal was joined by 600 recruits, of whom there died in that year 79, being a proportion of 13·16 per cent in Bengal.

His Majesty's 31st Regiment arrived in Bengal in June 1825, and was joined in that year by 500 recruits, of whom there died 65, a proportion of 11 per cent, in Bengal.

The volunteers are generally men from the age of 30 to 35, in which class the ratio of deaths from 1826 to 1829 (including a period of active service) was 6·92, while during the same period, the ratio in the class from 18 to 20 years was 16·12 per cent.

Besides the sending from England of lads too young for the service in India, there was another important circumstance as affecting their health, which was that of their having been sent out at improper periods; for they arrived in Bengal at the hot and rainy seasons, found to be more especially obnoxious to the lad or boy recruits; and of such, unfortunately, was the chief part of those sent out in 1826 to 1829, as well as before.

From the difference of habits of military and civil life, young soldiers are in every climate peculiarly liable to disease, and *cæteris paribus* the younger the more susceptible to feel the change; and this change has a direct tendency to induce a highly inflammatory diathesis, leading to such explosions of disease as witnessed here among the recruits. The tendency to disease exists it is true in all seasons in India in the young and plethoric, but it is in the hot and rainy seasons, and particularly at the commencement and termination of the rains, that endemial diseases are most dangerous, and fatal; yet this was the very time at which these recruits principally arrived in Bengal.

I took the earliest opportunity, and seized every occasion, to make the strongest representations on these important subjects, and of sending out soldiers for His Majesty's service to India at *proper*

age, and *season;* and there are on record my memorials on these subjects to the Commander-in-Chief in India, and to the Medical Department in England—of December 23d, 1826; May 31st, 1827; 6th January, 1828; and December, 1829—and upon which the Home authorities at last acted. In these memorials it was represented by me,

1st. That the soldier should arrive in India at the *age* and *period* when he can be of the greatest use when called upon for actual service. That age to be 24 or 26, or full grown manhood, as most favourable to health, and least so to disease in India.

2nd. That recruits and soldiers should be embarked in England, so as to arrive in Bengal at the commencement of the cool season, when they might be *marched* to their several Stations up the country, instead of *proceeding* by the river.

These memorials I accompanied with various statements; such as those in this communication, in proof of the great comparative mortality among the lad recruits particularly; as also the comparative mortality between the soldiers arriving in Bengal in the hot and in the cool season, as by the following abstract of statements from December 1825, to July 1829, of casualties of detachments His Majesty's service, arriving in Bengal from England, being,

In the cold season, per cent, ...	0·75
In the hot season, ...	3·0
Proceeding by water to join their corps, ...	6·50
On marching to join their corps, ...	0·50
Average of casualties on the voyage out, ...	1·50
Average of casualties from the date of arrival in Bengal to joining their corps, ...	6·75
Ditto of casualties of the whole of the detachments from their leaving England to join their corps in Bengal, ...	8·0

The accompanying Returns* elucidate these subjects still further, shewing the state of each Regiment His Majesty's service, their strength, the numbers who joined, and that died, from the date of their arrival in the Bengal command to the 31st December last.

On consulting the monthly admissions in the returns of sick, an abstract from which is given on the other side, the number of cases of disease (and they are particularly of the acute kind) and casualties, will be observed to correspond in a most remarkable manner with the range of the thermometer, especially at the Stations in Upper India; and so great is the difference between the cold season and the

* The Returns alluded to, will form an appendix to the next Number.—Ed.

hot, that a partial illustration is afforded of the influence of climate which sets all theory on the subject at defiance.

Among the soldiers exposed to the same degree of heat, the influence of the ingesta seems to be more powerfully injurious to the constitution than climate. There is a marked difference in the ratio of sick and casualties between the Cavalry and Infantry Regiments, stationed in the same cantonments, of His Majesty's service in India, in favour of the latter. In the Cavalry the soldier's pay is greater, and among them a superabundance of stimulant food and drink keeps so great a number in an almost perpetual state of proximity to inflammatory diseases.

During the cold months the men continually expose themselves, especially in the Upper Stations, to the direct rays of the sun, which is a great cause of disease, even when all accumulation of heat is prevented by the coolness of the breeze, for then the infringing of the direct rays of the sun upon an opaque body causes a greater increase of temperature than is observable by a thermometer.

Abstract from the Monthly Returns of Sick shewing the proportion of the average daily sick, and of deaths to strength per cent for four years.

Months,	Proportion of the average daily sick to strength per cent.				Total proportion of the average daily sick to strength per cent.	Proportion of deaths to strength per cent.				Total proportion of deaths to strength per cent.
	1830	1831	1832	1833		1830	1831	1832	1833	
January, ..	7·12	5·94	6·33	5·45	6·21	26	23	31	15	24
February,	7·58	5·85	5·96	5·52	6·23	20	10	12	18	15
March, ..	8·64	5·80	6·10	5·89	6·61	18	19	15	15	17
April, ...	9·24	7·14	6·88	6·22	7·37	28	19	17	15	20
May, ...	9·75	8·47	7·88	6·78	8·22	20	44	25	25	29
June, ...	9·34	8·47	7·36	7·19	8·09	31	37	32	37	34
July, ...	9·14	8·36	7·61	7·72	8·21	30	44	34	74	46
August....	9·49	9·10	7·74	8·29	8·65	34	47	35	74	48
September,	10·71	8·32	8·03	9.79	9·21	71	46	43	1·15	.69
October, ..	8·92	8·12	8·20	8·29	8·36	47	64	52	30	48
November,	8·16	7·18	7·05	7·79	7·54	51	60	43	35	47
December,	6·77	7·06	6·23	7·40	6·86	33	22	32	44	33
Total, ...	8·72	7·48	7·11	7·18	7·62	4·15	4·39	3·73	4·98	4·31

The sick at Landour and Chirra Poongee are not included in the above.

By the returns for four years, the minimum of sickness and deaths occurs in February. January and it are the driest months. The maximum of sickness and deaths occurs in September; being the cessation of the rains, when the exhalations have brought the surface to the consistence of mud—a state that appears especially to generate the miasmata producing fevers, &c.

Berhampore.

With respect to the localities of the Stations "as affecting their salubrity or otherwise," as required by the Committee, I have in reference to the return of the sick, &c. at the several Stations, given at the commencement, further to add, that at the Station of Berhampore, the Barracks are so placed, that one particularly is close to a large stagnant tank, into which the sewers of the Barracks and necessaries, &c. empty themselves, so that in the dry and hot season especially, the men are enveloped in the stench from it. That the influence of its exhalations spreads far, I have no doubt. The malaria from it, as well as numerous other sources, is of course the active cause of much of the mischief that infests the Station of Berhampore.

For the period of four years, from 1830 to 1833, inclusive, the average proportions of deaths to strength per cent was, *at* Berhampore,

Officers	7·62 per cent per annum.
Men	6·77
Women	5·71
Children	8·09

Cholera prevailed epidemically in Berhampore in 1829 and 1830, and commenced in the temporary sheds recently erected, (not far from the great tank before mentioned) for part of His Majesty's troops; after which it appeared in the women's quarters—a low one-storied brick-building; afterwards on the ground story; and then in the upper story of the Barracks next the great tank, &c.

Fort William.

In the Station of Fort William, in the Barracks generally occupied by His Majesty's troops, the apartments for the men are deficient in height and ventilation. The buildings are too crowded together. The estimate of space, and of domestic convenience, has been too confined for the climate.

From the crowding of the buildings, and height and proximity of the fortifications, the radiation of heat is not only very great, but there is prevented the dissipation of those malarious vapours of which there appears to be so copious a supply from various sources in Fort William.

One of the consequences of all these is, in the warm season especially, the men feel so oppressed at night that they leave their rooms and expose themselves to all the causes and bad effects of suppressed transpiration.

The average ratio of mortality in His Majesty's troops quartered in Fort William is as follows, for four years from 1830 to 1833—

Officers	5·88 per cent per annum.
Men	7·59
Women	10·73
Children	16·29

Fort William is one of the worst, if not the very worst, of the Military Stations in India for children.

Cawnpore.

In the Station of Cawnpore for the period of four years, from 1830 to 1833, the average proportion of deaths to strength is,

Officers	3·10 per cent per annum.
Men	4·55
Women	4·04
Children	9·22

As to the locality of this cantonment, none of the Barrack buildings come close to the river, excepting the Hospital in which the sick of the King's Regiment of Infantry are treated. The soil rests on a substratum of Kunkur, which is favourable to the dryness of the Station. The declivity of the site secures it against any accumulation of moisture; the drainage is also facilitated by several small ravines or gullies, which intersect the cantonment, each of which during the rainy season becomes a streamlet; thus the water does not lodge, but runs quickly off into the river (above which all the Barracks are sufficiently elevated) or it is speedily absorbed, so that the wet season at Cawnpore is generally found pleasanter than in many other Stations in Upper or Central India.

The site of the Barracks of His Majesty's Infantry Regiment is pretty high, that of the King's Cavalry Regiment not so high; but that of all however is sufficiently elevated to allow of the water passing off.

The ground in the rear of the King's Infantry Regiment's Barracks is broken in many places, by the violence of the periodical rains, into deep fissures and ravines, containing numerous cavities, which, however individually small, may form in the aggregate a consider-

able deposit of stagnant water, which before its final evaporation cannot fail to be an agent more or less active in the generation of miasmata.

In the Barracks for the European troops here, the plans adopted by the architect would appear to have arisen from the idea of a Regiment standing in open column of companies, which however ingenious in a military point of view, is rather objectionable in a medical one, as it makes one building a screen to another, and thus opposes perfect perflation, an object of paramount importance where masses of men are to be congregated together, and where a perpetual current of air becomes the grand neutralizer of insalubrious miasmata.

The prevailing winds are from the west and east, varying to the north or south. If the buildings were placed in echelon this might be prevented.

Meerut.

In the Station of Meerut the locality is in Meerut deemed good. There are a few jheels and swamps in the vicinity ; but not near, or considerable enough to have much effect on the health of the troops. The country around is flat ; the soil is sandy, with a slight declination to south sufficient to carry off the heavy rains into the Kallee Nuddy to the eastward.

Notwithstanding the northern latitude of Meerut, considerably without the tropics, and in the third climate, the heat is intense in the dry and hot season, and tropical diseases are prevalent during the hot and rainy seasons. For the period of four years, from 1830 to 1833, the average proportion of deaths to strength is, at Meerut,

Officers	1·35	per cent per annum.
Men	1·98	
Women	2·21	
Children	4·91	

The diseases are such as arise from sudden and considerable variations of temperature and malaria, and especially among the soldiers, aggravated by exposure to the sun and intemperance.

Dinapore.

In the Station of Dinapore the aspect of the Barracks being the reverse of what it should have been in respect to the prevailing winds, free perflation is prevented. The roof is flat and chunamed ; the length of each building is 800 feet, and width 20 feet ; there is a verandah on each side.

The masses of men, women, and children in these Barracks, is another cause of the unhealthiness experienced generally in them by the troops. There are no separate accommodations for the women and children. The doors and windows are jealousied.

The *cold* weather here was generally ushered in by severe hepatic and dysenteric affections. And in the *hot* season there were severe ardent fevers, very sudden in their operation, and often terminating in apoplexy.

In His Majesty's 13th Light Infantry for the period of two years, for 1830 and 1831 last, at Dinapore, the average proportion of deaths to strength was,

Officers	1·79 per cent per annum.
Men	3·84
Women	4·23
Children	12·37

The facility with which the men could obtain toddy, and deleterious liquors in excess, was one great source of disease and mortality, as also the difficulty of confining the men within bounds, there being no enclosure to the Barrack compound.

The 13th being a Light Infantry corps, their movements were more likely to expose them to profuse perspiration, and consequently to more frequent alterations of heat and cold, with the usual bad effects.

Boglipore.

In the Station of Boglipore the Barracks formerly occupied by His Majesty's 3rd Buffs, were merely a set of buildings erected temporarily in 1825 as stables for some Native Cavalry, and were very inimical to health.

Ghazeepore.

The Station of Ghazeepore appears to hold a middle station as to healthiness. The soil is readily permeable by the rain falling on its surface, which sinking down to a very considerable depth before it finds a hard bottom to detain it, is soon out of reach of superficial evaporation, and cannot afford the constant supply of moisture necessary in co-operation with other agents to produce the maturity of marsh miasmata. From the continuation of these circumstances it might *a priori* be thought that the Station possesses to a great degree an immunity from marsh miasmata.

For the period of four years, from 1830 to 1833, the average proportion of deaths to strength is,

Officers.....	2·75 per cent per annum.
Men.....	3·80
Women	3·29
Children	6·62

Kurnaul.

In the Station of Kurnaul the locality of the Barracks for His Majesty's Regiment is the best the place afforded. The soil generally is light and sandy on the surface, but at the depth of 12 or 15 inches it is a stiff clay; in some parts however it is calcarious, (and of which the natives make lime). The large canal in the immediate vicinity forms an irregular semicircle near the Station, and tends in a great measure to drain that part.

For the period of three years, from 1831 to 1833, inclusive, in which it has been occupied by a King's Regiment, the average proportion of deaths to strength per cent is,

Officers	1·23 per cent per annum.
Men	3·00
Women	1·73
Children	6·62

Agra.

In the Station of Agra the cantonment for His Majesty's troops is stated to be elevated about 170 feet above the level of the river Jumna, from which the distance is about the same as from the Fort, that is 1½ mile. The immediate banks of the river are deeply indented with water-courses, which serve to convey the rain water into the river.

The 13th Light Infantry Regiment has been healthy ever since its arrival there, a period of two years, in which there died 29 men; but almost all of them had the foundation of their disease laid in Dinapore. This comparative healthiness, as far as locality is concerned, arises from the cantonment enjoying constant ventilation, the water running immediately off, the drainage being good, and there being no stagnant pools, or sources of malaria in the vicinity, and especially that the troops are well accommodated, and so are the sick.

Setting aside intemperance, which is the cause of so many diseases of the soldier in India, they may be said to have enjoyed a state of health at Agra almost equal to what a Regiment would be found to do in the healthiest parts of Europe.

For the period of two years, for 1832 and 1833, in which there has been a King's Regiment in Agra, the average proportion of deaths to strength per cent is,

Officers	
Men	1·91
Women	1·45
Children	8·92

I have the honour, &c.

(Signed) W. R. BURKE,

Inspect. Gen. Hospitals H. Majesty's Forces in India.

ART. VIII.—*Observations on the Burmese and Munipoor Varnish Tree,* "Melanorrhœa usitata," *which has lately blossomed in the Honorable Company's Botanic Garden. By* N. WALLICH, M.D.

When I published my account of this tree in 1830,* I had only met with it in fruit, and was obliged to confine the description of the flower to what could be gathered from a few decayed and not very perfect samples in my possession. The generic character was chiefly derived from specimens of another species, *Melanorrhœa glabra,*† a native of the coast of Tenasserim. As I have recently had a tree of *M. usitata* in flower in this garden, I am able to furnish the following details, accompanied by a lithographic sketch of a flowering panicle, from a drawing made by one of the painters of the establishment.

The individual tree to which I allude is one among several which were raised from Munipoor seeds presented by Mr. George Swinton. The seeds were sown in July 1827, and began germinating exactly a fortnight afterward. About the same period some seeds that had been procured from Martaban, being more fresh, sprang up seven days after being put into the ground. The tree which has blossomed is the largest among the seventeen individuals which we at present possess. It measures in height about 22 feet, with a clean stem of seven feet, having a circumference near the base of 14 inches. It has not many branches, and is now very scantily furnished with leaves. It began opening its flowers on the 20th of January last, and continued nearly one whole month in flower. There are at present a small number of fruits on the tree, which I expect will ripen in the course of next month.

* Plantæ Asiat. Rar. 1. p, 9. tab. 11 and 12.

† Ibid 3. p. 50 ab. 283.

Panicles of flowers terminal on leafless branchlets, broad-oval, spreading, much and loosely subdivided, 12 to 16 inches wide at the base; the divisions cylindric, covered with much soft down. There is a small linear, caducous bract under each branch. Flowers white, inodorous, rather large, two or three in each fascicle, supported by pedicels half an inch to an inch in length. Calyx smooth, consisting of five sepals which are marginally soldered together into one, forming a conical, attenuated, obtuse hood, slightly marked with parallel veins; it falls off the instant the coralla is ready to expand, leaving an annular vestige on the peduncle immediately under the coralla; its base circular, irregularly slit a little way, in four or five places. *Petals* white, imbricating and slightly contorted in estivation, lanceolate-oblong, rather obtuse, with entire, a little undulated, ciliated margins, thin and membranous, pubescent on both sides, minutely reticulated, half an inch long. *Torus* large, fleshy, hemispherical, pitted for the insertion of the stamens, its base five-lobed. *Stamens* very numerous, straight, spreading in all directions, half the length of the petals; *filaments* subulate, smooth; *anthers* oval, versatile. *Ovary* very small, obliquely oval, smooth, supported from the centre of the torus by a short, cylindric, pubescent pedicel, one-celled; ovule suspended from a lateral ascending funicle. *Style* rising obliquely from the vertex of the ovary, subulate, not reaching to the ends of the stamens. *Stigma* minute, obtuse.

The accompanying figure represents a panicle of flower reduced to one half of its natural size. Fig. 1, flower-bud, the hooded calyx commencing to detach itself, and at Fig. 3, completely separate. Fig. 2, corolla in estivation. Fig. 4, the same fully expanded. Fig. 5, petals separate, showing the pitted torus. Fig. 6, ovary opened showing the insertion of the ovule.

ART. IX.—*Proceedings of the Asiatic Society.*

Wednesday Evening, the 2d January, 1839.

The Right REV. the LORD BISHOP of Calcutta, Vice-President, in the chair.

The Proceedings of the last Meeting were read.

The Meeting then proceeded to the election of Office-bearers for the ensuing year, when the following gentlemen were chosen:—

The Right Rev. LORD BISHOP of Calcutta,
The Honble. Sir J. P. GRANT,
H. T. PRINSEP, Esq.,
Col D. MACLEOD,
} Were elected Vice-Presidents.

Mr. W. CRACROFT,
Mr. W. P. GRANT,
Mr. D. HARE,
Dr. Geo. EVANS,
Dr. M'CLELLAND,
Capt. FORBES,
Dr. STEWART,
and
Dr. WALLICH.
} Members of the Committee of Papers.

Dr. GOODEVE and Mr. R. O'SHAUGHNESSY, proposed at the last Meeting, were balloted for, and duly elected Members of the Society.

Messrs. A. PORTEOUS and J. COWIE were proposed by the Officiating Secretary, seconded by the Vice-President.

Dr. O'SHAUGHNESSY apprised the Meeting that the Committee of Finance had recommended 20 rupees per mensem, as an increase to the Clerk HERAMBANATH THAKUR'S salary.

Resolved,—That the meeting approve of the decision of the Committee of Finance, and that it take effect from the date of the Clerk's application.

Read a letter from J. K. KANE, Esq., Secretary of the American Philosophical Society, acknowledging receipt of the first part of vols. 19 and 20 of the *Asiatic Researches*, and vols. 5 and 6 of the *Journal of the Asiatic Society*.

Library.

Read a letter from J. VAUGHAN, Esq., Librarian of the American Philosophical Society, forwarding the following works for presentation to the Society—

Transactions of the American Philosophical Society, Vol 6, Part 1, New Series.

Transactions of the Literary and Historical Committee of the Society.

Read a letter from M. CASSIN, Book Agent of the Society in Paris, enclosing account of sales of oriental publications sold by him in France, and forwarding from the proceeds thereof several recent publications for the use of the Society. He had likewise sent several books for sale in this country.

Resolved,—That the books for sale be advertized on the cover of the *Journal, Asiatic Society*, with their prices.

A brochure by the Royal Society of Cornwall, presented by Capt. F. JENKINS through Dr. WALLICH.

Meteorological Registers kept at the Mauritius, during the last six months of 1836, and first six months of 1837, were presented by M. JULIEN DESJARDINS, Secretary of the Natural History Society of the Mauritius.

Read a letter from MADHUSHUDANA GUPTA, forwarding specimens of the plates for the "*Sarira Vidya*" engraved by Native artists.

The Officiating Secretary with reference to the very high cost and inferior execution of the plates submitted, proposed a reference by the overland mail to Professors QUAIN and PAXTON, by whose friendly co-operation he had no doubt casts of their anatomical wood-cuts could be procured at half the price, and in half the time the Native artist would require.

The proposition was seconded by Baboo RAMCOMUL SEN, and unanimously agreed to.

Antiquities.

Read a letter from J. P. GRANT, Esq., Officiating Secretary to the Government of India, intimating that measures have been taken by the local authorities to prevent any further dismantling of the *Kanarak* temple, or Black Pagoda.

Museum.

Read a letter from Major HAY, with reference to a Museum of Natural History collected by him from the Cape and the Eastern Archipelago.

Resolved,—That the Officiating Secretary be requested to inform Major HAY, that the present state of their funds entirely precludes their purchase of his collection, but that the Society will be happy to allow the use of their rooms for the reception of the specimens, and to employ their establishment for their care and preservation. It was further decided that the Society make a representation Government on the subject.

The Officiating Secretary then laid before the Meeting the Annual Report of the past year's transactions.

[This Report will appear in a subsequent number.]

Baboo RAMCOMUL SEN submitted the Account Current of the Society for the past year, in which a balance of rupees 7,755: 1: 2 stands in favour of the Society on the 31st December, 1838.

[The Account Current will be found at the end.]

Proposed by Baboo RAMCOMUL SEN, seconded by Mr. HARE, and unanimously agreed, that a sum of rupees 4,500 be invested in Company's five per cent. Government Securities.

The Officiating Secretary informed the Meeting, that with reference to a communication made by him to Messrs. SHERRIFF and Co. regarding the repairs of the Society's house, that these architects report that the roof of the house is in a very ruinous state, and unless immediate steps are taken, serious danger is apprehended.

Mr. H. T. PRINSEP remarked that Mr. JAMES PRINSEP thought that additional rooms might be built for the Museum.

Resolved,—That Col. MACLEOD be requested to furnish a plan to that effect, and an estimate of the probable expense, in order that the Society may determine on the subject at their next Meeting.

After the conclusion of the routine business, Mr. H. T. PRINSEP called the attention of the Members present to M. MASSON's large collection of coins and relics then exhibited on the table.

This collection Mr. PRINSEP stated had been made from the funds advanced to M. MASSON by the Government; the proceeds having been forwarded through Col. POTTINGER to Bombay for transmission to the Honble. Company's Museum in England, were ordered by the Right Honble. the Governor General to be first sent to Calcutta for examination and arrangement by the gentlemen connected with this Society.

The articles having consequently been sent round in the "John Adam" from Bombay, were laid upon the table of the Society in order that if any gentlemen were disposed to undertake their examination and arrangement, the Society might form them into a Committee for the purpose.

The collection consisted of some hundred gold and silver coins and several thousand copper coins.

Some discussion arose as to the steps to be taken by the Society with this collection. By an unfortunate coincidence, all the leading numismatologists of the Society being absent from Calcutta, either through illness (as Mr. JAMES PRINSEP and Professor MALAN,) or on Military duty (as Col. STACY, Capt. CUNNINGHAM, and Mr. TREGEAR) it was suggested that the Government be requested to forward the collection to England, where the Court of Directors might refer the examination to Mr. J. PRINSEP, who will no doubt be happy to meet the wishes of the Court.

Dr. *The Asiatic Society,*

Establishment and Charges.							
To paid Secretary's Office Establishment, from December 1837 to 30th November, 1838				722	0	11	
,, Ditto for Contingent charges				153	0	0	
Oriental Library.							
,, Paid Establishment for the Custody of Oriental Books deposited by Government, from ditto to ditto, at 78 Rs.				936	0	0	
Library and Charges.							
,, Paid Establishment, from ditto to ditto	1,627	15	0				
,, Contingent Charges	325	2	5				
,, For binding Books	285	12	0				
				2,238	13	5	
Museum.							
,, Paid Establishment, from ditto to ditto	2,619	11	6				
,, Contingent Charges	705	7	6				
,, Making Cabinets	246	0	0				
				3,571	3	0	
							7,621 1 4
Printing.							
,, Paid Mr. Huttman for printing 20th vol. 1st. part of the Researches				925	0	0	
,, Kossinauth for plates				244	0	0	
,, Mr. Huttman for Paper for ditto				120	0	0	
,, Munnoololl for Oriental Catalogues				250	0	0	
							1,539 0 0
Building.							
,, Paid for making a Cook-Room for the Librarian in the Secretary's Office							199 12 1
Journal Asiatic Society.							
,, Paid J. Prinsep, Esq. for the Journal Asiatic Society being supplied to the Members of the Society in 1837							2,190 8 0
,, Remitted to England for the bust of Mr. Wilson							1,000 0 0
Establishment and Charges for the Statistical Committee.							
,, Paid Establishment for the Statistical Committee							383 3 0
Balance in the Bank of Bengal							7,755 1 2
Co's. Rupees							20,688 9 7

for the year 1838. *Cr.*

By Balance of account closed up to 31st Dec. 1837... ..	.....		2,323 3 10
Members.			
,, Collections made for quarterly Contributions and admission fee from January to December, 1838....	7,848 15 6		
Subscriptions for Busts.			
,, Subscriptions made for the Busts of Sir William Jones, H. T. Colebrooke, and H. H. Wilson....	1,778 0 0		
			9,626 15 6
Government Allowance.			
,, Cash received from the Sub-Treasurer, allowance for the Custody of Oriental Books transferred from the College of Fort William, from 1st Dec. 1837 to 30th Nov. 1838, at 78 Rs.....	936 0 0		
,, Ditto ditto for the Museum of the Society from ditto to ditto at 200 Rs.....	2,400 0 0		
,, Ditto ditto towards the Publication of Oriental Works, and Works on Instruction in the Eastern languages, for Oct. and Nov. 1838 at 500 Rs.....	1,000 0 0		
			4,336 0 0
,, J. Prinsep, Esq. balance of the Fund appropriated for the publication of Oriental Books.....	3,599 1 1		
,, Sub-Treasurer, interest on the Government Securities deposited with the Govt. Agent up to 30th June, 1838...	803 5 2		
			4,402 6 3
Co's. Rupees.....	.....		20,688 9 7

RAMCOMUL SEN,
Officiating Secretary Asiatic Society.

CALCUTTA,
31*st December*, 1838.

Meteorological Register, kept at the Assay Office, for the Month of January, 1839.

Forenoon, 10 A. M.														Afternoon 4 P. M.													
Atmospheric Pressure.		Temperature.				Hygrometry.			Aqueous tension.			Weather.			Atmospheric Pressure.		Temperature.		Hygrometry.			Aqueous tension.			Weather.		
Old Stand Barometer.	Height at 32 Fah.	River water.	Well water.	Air.	Dew point.	Depression.	Differential thermometer.	Hair Hygrometer.	By Dewpoint.	By Wetbulb.	By Hair Hygrometer.	Wind. Direction.	Wind. Force.	Aspect of Sky.	Old Stand Barometer.	Height at 32 Fah.	Air.	Dew point.	Wet-bulb Depression.	Differential thermometer.	Hair Hygrometer.	By Dewpoint.	By Wet bulb.	By Hair Hygrometer.	Wind. Direction.	Wind. Force.	Aspect of Sky.
																								s. e.	0½	clear
29,907	29,898	73,9	75,4	74,7	54,5	9,6	9,6	80	51	55	59	S. o.	1	clear.	29,810	29,787	80,9	43,6	14,2	12,9	72	29	40	46	s. e.	0½	do.
,949	,937	74,3	76,3	74,1			5,5	5,5	91		72	80	n. o.	1	do.	,845	,822	87,3		13,3	12,3	74		45	49	s. e.	0½	do.
,017	,008	74,2	75,6	75,7			7,8	7,4	86		63	70	S. e.	1½	do.	,913	,887	83,3		13,8	12,7	75		44	51	s. e.	0½	do.
,008	,993	76,5	76,9	76,9	63,5	6,6	6,7	89	65	69	76	S. w.	2½	cir.cum.haze													
,059	,059	72,2	74,7	70,5	52,0	12,4	11,8	71	55	37	44	N. w.	3	cir. cum.	,948	,928	75,9	49,5	14,0	12,0	69	41	36	42	N. o.	2	cumuli.
,076	,065	72,1	74,6	70,9	56,0	10,6	8,9	79	62	45	57	N. o.	2	clear.	,946	,926	74,9		13,8	12,6	69		36	42	N. o.	2	clear.
,029	,019	71,7	74,1	68,3			9,4	9,2	78		50	56	n. e.	1	do.	,904	,899	74,4		13,4	11,9	71		36	45	n. e	1	cir.cum.few.
,985	,973	72,2	74,5	69,5	53,0	8,7	8,1	82	59	54	63	n. e.	0½	do.	,855	,839	75,3		12,2	10,4	75		42	51	e. n. e.	0½	clear.
,059	,937	73,9					5,3	95			89	S. e.	4½	Nimbi.	,832	,806	78,0		9,0	9,0	86		60	70	S. e.	4½	cldy. all day.
,035	,025	72,6	77,3	71,5			5,3	5,3	93		71	84	N. o.	2½	ovrct.cum.st.	,928	,907	75,1		6,7	6,1	89		67	76	n. e.	0½	cum. strat.
,008	,999	71,7	76,1	73,4			5,8	5,8	92		70	82	e. n. e.	2	cldy.	,903	,882	76,1		5,8	5,0	94		71	87	N. e.	3	Nimbi.
,020	,019	71,6	74,4	70,5			3,5	3,0	97		80	93	N. e.	2	do. showery.	,914	,898	72,9		4,9	4,3	94		75	87	o. e.	0½	do.
,996	,000			70,1			6,2	5,4	91		66	80	n. e.	2	do. haze	,936	,917	72,3		7,6	6,6	88		61	74	n. e.	1½	cir.strat.cldy.
,046	,049	71,7	75,6	70,1			5,4	5,1	93		70	84	n. o.	1	cir. cum. & st.	,936	,913	75,2		7,1	6,1	89		65	76	e. n. e.	0½	cldy.
,007	,992	71,7	75,6	72,4			6,7	6,8	89		65	76	n. o.	1	cir. strat.	,891	,867	74,9		6,5	5,2	91		69	80	N. o.	1½	do.
,040	,037	71,6	74,5	70,6	65,0	5,0	4,6	94	85	72	86	n. w.	2½	cldy.	,928	,913	73,5	63,0	7,6	6,3	87	73	62	72	N. e.	1½	cldy.
,065	,060	70,4	73,9	69,8	56,5	9,1	8,7	79	65	52	57	N. o.	2½	overct. cl.	,960	,942	72,6	55,0	10,3	9,1	77	56	49	54	N. o.	2½	do.
,158	,148	70,1	73,8	68,1	50,0	9,9	9,0	78	54	47	56	N. o.	2½	clear.	,047	,047	71,9	53,8	11,1	9,3	76	54	45	52	N. o.	2½	clear.
,160	,170	69,4	73,4	67,0	52,0	9,2	9,0	78	61	50	56	N. o.	2½	do.	,004	,998	70,9	48,8	6,9	10,3	73	47	65	48	N. w.	2	do.
,077	,084	69,0	73,7	66,5	48,5	8,1	7,6	82	55	55	63	N. o.	2½		,958	,944	71,7	49,0	6,1	11,3	73	47	67	48	N. e.	1½	do.
,110	,127	69,0	73,7	68,5	51,0	6,8	6,2	88	57	62	74	S. w.	2	fine.	,010	,998	75,3	48,0	11,6	10,7	79	41	45	57	S. w.	1½	clear.
,140	,141	70,6	74,5	71,1	52,0	5,2	5,3	75	53	72	51	S. e.	2½	cl.	,014	,014	78,3	47,0	12,9	12,1	76	35	43	52	s. e.	1	do.
,113	,120	71,0	74,3	70,5	54,0	4,6	4,9	94	59	75	87	n. o.	0½	hazy.	,992	,980	75,7	48,0	11,3	9,9	77	40	46	54	n. e.	0½	cir. cum.few.
,995	,095	70,4	74,2	71,3	51,0	8,2	7,5	82	52	57	63	n. o.	0½	do.	,976	,954	75,1	50,0	10,0	10,0	79	44	52	57	n. e.	0¼	cldy. haze.
30,044	30,039	71,8	74,8	70,9	54,2	7,3	6,9	85	59	61	70	Lt. & heavy.	2		29,932	29,916	75,4	50,5	10,0	9,3	79	46	53	59	Lt. & heavy.	1½	

JOURNAL

OF

THE ASIATIC SOCIETY.

No. 86.—FEBRUARY, 1839.

ART. I.—*Report on the Settlement of the ceded portion of the District of Azimgurh, commonly called Chuklah Azimgurh, by* J. THOMASON, ESQ. *Collector of Azimgurh, dated Agra, December* 16*th*, 1837.

1st. The completion of the settlement of Chuklah Azimgurh, affords the opportunity for offering some remarks on its state. The settlement operations have extended from the year 1833 to 1837, and been conducted either by myself, or others acting under my superintendence. I am hence desirous to place on record the principles which have guided me, and to note some circumstances, a correct understanding of which is essential to the future prosperity of the district. My remarks are intended to be strictly practical, and to convey impressions and opinions having reference to the locality.

2nd. A brief statistical account of the Chuklah will form a fitting introduction to the subject.

3rd. It lies between the 25th and 27th degrees of north latitude, and the 82nd and 84th degrees of east longitude. It is bounded on the west by the Oude territories, on the north by the river Goggra and district of Goruckpore, and on the south and east by the river of Benares. The country is generally low, with water near the surface, and abounding in large jheels, or lakes. It is traversed from west to east by several rivers or streams, all of which take their rise from lakes situated either in the district itself or in Oude, at a short distance to the west between the Goggra and the Goomtee, and fall into the Ganges; of these the Surjoo and the Tonse are navigable during the rains, whilst the Phurchee, the Koonwur, the Bainschee, the Munglaai, the Beysoo, and the Gunghee, are never navigable, but are highly valued for the irrigation which they extensively supply.

4th. The soil is generally fertile, and peculiarly adapted for the cultivation of the Sugar-cane. There are however Salt or *Oosur* plains, which no culture can ever render productive.

5th. The size and general character of the several sub-divisions of the district will best appear from the following tables. They show the arrangements which have been made for the fiscal and civil administration and for the police of the district, and the charge which the establishments constitute on the resources of the district.

I.

Table showing the size and resources of the several Pergunnah Divisions of the Chuklah.

Name of Pergunnah.	Name of Tuppah.	No. of Villages.	Area in Acres of cultivated Land.	Area in Acres of culturable Land.	Area in Acres of uncultivated waste.	Total Area in Acres.	Highest Jumma of present Settlement.	Population.
Atrowlee Tilhenee,	.. .. ..	361	43,867	22,642	7,989	74,498	81,587	46,271
Kowreeah,	.. .. ..	145	20,924	12,777	4,910	38,611	37,917	18,840
Gopalpoor,	.. .. ..	175	16,467	7,417	6,819	30,703	27,920	15,818
Suggree,..	Akberpoor, ..	71	7,120	1,353	6,620	15,093	14,918	10,599
	Buchour, ..	40	3,203	720	1,681	5,604	5,656	3,494
	Baroohhur, ..	37	3,117	808	3,126	7,051	8,881	4,710
	Birman, ...	35	3,975	1,055	3,330	8,360	7,498	4,461
	Bindrowl, ...	120	11,327	1,986	13,136	26,449	24,447	18,886
	Bilaree, ...	72	6,586	1,451	5,651	13,688	14,245	9,806
	Chinchool, ..	92	10,536	5,316	9,494	25,345	16,794	12,059
	Havelee Khoormabad, ..	93	4,684	1,180	3,866	9,730	8,630	5,595
	Khas, ...	64	8,202	7,689	8,152	24,043	14,558	10,908
	Koorkoonar, ..	52	6,118	1,556	3,876	11,550	12,019	3,983
	Total of Pergh. Suggree, ...	676	64,867	23,114	58,932	1,46,913	1,27,646	84,501
Ghosee, ...	Chakeysur,.. ..	60	9,760	4,152	3,971	17,883	20,507	7,319
	Havelee, ...	159	14,800	8,039	15,727	38,566	28,271	11,416
	Simree, ...	28	3,750	2,401	5,532	11,683	7,951	2,473
	Koorhunee, ...	65	8,783	3,717	7,121	19,621	17,560	9,958
	Gontha, ...	63	8,118	3,109	6,214	17,441	19,790	11,506
	Total of Pergh. Ghosee, ...	375	45,211	21,418	38,565	1,05,194	94,079	42,672
Nuthoopoor,	.. .. ..	327	38,647	10,276	26,784	75,707	58,887-6	38,724
Mahol, ...	Uturahee Rooshungunge, ...	89	22,006	7,101	17,429	46,636	46,926	29,481

Table showing the size and resources of the several Pergunnah Divisions of the Chuklah.—(Continued.)

Name of Pergunnah.	Name of Tuppah.	No. of Villages.	Area in Acres of cultivated Land.	Area in Acres of culturable Land.	Area in Acres of uncultivated waste.	Total Area in Acres.	Highest Jumma of present Settlement.	Population.
	Powai, ...	118	14,923	11,547	5,662	32,132	29,810	14,107
	Deedargunge,	162	23,759	15,798	9,140	48,697	52,412-4	30,863
	Mahol, ...	165	18,783	15,534	5,263	39,580	38,553	22,215
	Total of Pergunh. Mahol,	534	79,571	49,980	37,494	1,67,945	1,67,711	96,666
Nizamabad,	Utharsee, ..	75	8,557	1,968	3,165	13,690	17,907	18,407
	Belah, ..	112	15,576	5,312	15,461	36,349	41,941	19,106
	Phurchuk Havelee,	182	14,205	5,385	12,619	32,209	31,487	19,205
	Dobartah, ..	122	12,106	4,120	7,596	23,822	27,995	15,087
	Dowlutabad, ..	114	19,838	4,427	20,278	44,543	47,982	29,208
	Dealpoor, ..	56	7,793	1,708	11,203	20,704	20,335	9,004
	Kotah, ..	136	13,347	6,873	9,811	30,031	30,658	21,270
	Goozarah, ..	83	8,070	2,947	7,494	18,511	18,563	12,495
	Nundaow, ..	130	14,172	4,330	17,241	35,743	41,654	26,889
	Hurbunspoor,	140	12,446	4,680	8,959	26,065	28,889	12,946
	Total of Pergunh. Nizamabad,	1150	1,26,110	41,750	1,13,807	2,81,667	3,07,411	1,83,617
Kurriat Mittoo,	Amdhyee, ..	28	2,876	1,691	2,572	7,139	6,844	2,706
	Taree, ..	38	3,596	965	3,100	7,661	7,452	2,554
	Total of Pergunh. Kurriat Mittoo, ..	66	6,472	2,656	5,672	14,800	14,296	5,260
Cheriakote,	Havelee, ..	122	8,185	3,241	3,354	14,780	16,320	8,005
	Khanpoor, ..	78	6,013	2,355	4,102	12,470	11,643	7,121
	Dhurwara, ..	52	7,186	3,099	4,269	14,554	12,152	9,026
	Suleemabad, ..	38	2,575	1,444	1,251	5,270	4,969	3,260
	Total of Pergunh. Cheriakote, ...	290	23,959	10,139	12,976	47,074	45,084	27,412
Belhabans,	Ooturuha, ..	89	12,764	5,312	6,478	24,554	25,548	6,472
	Duhkunha, ..	74	7,218	3,223	3,834	14,275	14,389	8,421
	Total of Ph. Belhabans,	163	19,982	8,535	10,312	38,829	39,937	14,893
Mahomedabad Gohna,	Oowkaf, ..	30	1,566	903	1,355	3,824	3,757	1,369
	Behrōzpoor, ..	121	14,304	8,125	12,187	34,616	32,543	22,800
	Purduha, ..	61	9,842	5,987	8,981	24,810	21,079-8	9,755

Table showing the size and resources of the several Pergunnah Divisions of the Chuklah.—(Continued.)

Name of Pergunnah.	Name of Tuppah.	No. of Villages.	Area in Acres of cultivated Land.	Area in Acres of culturable Land.	Area in Acres of uncultivated waste.	Total Area in Acres.	Highest Jumma of present Settlement.	Population.
	Chitpoor, ...	47	5,076	4,662	6,993	16,731	11,966 0 0	5,129
	Havelee, ...	120	8,196	5,178	7,768	21,142	16,155 0 0	9,725
	Khanpoor, ...	64	6,278	3,685	5,527	15,490	12,810 0 0	6,816
	Kair, ...	101	9,819	5,820	8,731	24,370	21,784 0 0	9,440
	Nudwan, ...	78	9,983	4,288	6,431	20,702	20,036 0 0	12,628
	Nusseeroolahpoor, ...	72	9,702	5,542	8,314	23,558	19,741 10 0	17,987
	Walledpoor, ...	65	6,295	2,347	3,521	12,163	13,878 0 0	8,584
	Total of Ph. Mahomedabad Gohna.	759	81,061	46,537	69,808	1,97,406	1,73,750 3 0	1,04,233
Mhownat Bhunjun,	....	64	4,886	3,888	5,530	14,304	11,727 6 9	14,625
Deogaon, ...	Burdah, ...	81	5,198	1,751	5,252	12,201	12,160 12 0	9,377
	Chowree, ...	70	13,478	3,962	11,883	29,323	25,429 0 0	16,164
	Sonaree, ...	23	3,526	929	2,786	7,241	7,507 8 0	4,583
	Saifabad, ...	22	2,489	756	2,266	5,511	4,759 0 0	4,636
	Shahpoor, ...	52	5,729	1,965	5,896	13,590	12,522 0 0	7,737
	Shah Suleempoor, ...	34	3,814	1,469	4,405	9,688	7,631 0 0	3,889
	Kusbah Havelee, ...	102	7,580	1,992	5,974	15,546	16,533 4 10	12,218
	Koobah, ...	111	12,556	3,249	9,746	25,551	24,001 0 0	22,948
	Khurson, ...	24	2,840	834	2,503	6,177	8,146 0 0	4,471
	Total of Pergh. Deogan. ..	516	57,210	16,907	50,711	1,24,828	1,18,689 8 10	86,023
	Grand Total, ...	5,541	6,29,234	2,78,036	4,50,309	13,57,579	13,06,642 12 0	7,79,555

Note.—The total area is inserted, as given by the Survey conducted on the principles of European science. The cultivated and culturable areas are given from measurements made by natives in the method of the country The Jumma is the maximum which can be reached during the term of the Settlement, but its perfect attainment is dependent on the lapse of some Maafee tenures which are held rent-free during the lives of the present incumbents. The population is given from the average of several estimates made by different persons, and under different circumstances, and has been corrected as much as the nature of the case admits. It is however at best but an approximation to the truth.—Total area 2,121 square miles; and 367·5 inhabitants to the square mile.

II.

Table showing the extent of the several Fiscal Divisions of the Chuklah, and the cost of the Tehseeldaree Establishments.

Name of Tehseeldaree.	Name of Perghs. it contains.	No. of Villages.	Total Area in Square Miles.	Population.			Highest Jumma of Settlement.	Charge of Establishment.	Per Centage of Charge on Jumma.
				Agricultural.	Non-Agricultural.	Total.			
1. Koelsah,	Atrowleeah Tilhanee, Kowreeah, and Gopalpoor.	681	224	59,421	21,508	80,929	1,47,424	6,336	4 1¾
2. Suggree,	Suggree, ..	676	230	65,102	19,399	84,501	1,27,646	4,476	3 6¼
3. Ghosee,	Ghosee and Mithanpoor, ..	702	282	53,528	27,868	81,396	1,52,966	4,596	3 0
4. Mahol, ..	Mahol, ..	534	261	69,740	26,926	96,666	1,67,711	5,316	3 1
5. Nizamabad	Nizamabad,	1,150	440	1,34,334	49,283	1,83,617	3,07,411	9,108	2 15
6. Cheriakote, ..	Cheriakote, Keriat Mitthoo, & Belhabans,	519	158	34,697	12,868	47,565	99,317	4,284	4 8
7. Mahomedabad Gohna,	Mahomedabad, Gohna, & Mownat Bhunjun,	823	331	73,765	45,093	1,18,858	1,85,477	4,812	2 9¼
8. Deogaon,	Deogaon, ..	456	195	63,517	22,506	86,023	1,18,689	4,008	3 6
	Total, ..	5,541	2,121	5,54,104	2,25,451	7,79,555	13,06,642	42,936	3 4¼

Note.—The area, population, and Jumma are entered as in the preceding Table.

III.

Table showing the extent of the several Police Divisions of the Chuklah, and the cost of the Establishment.

Name of Tehseeldaree.	Name of Thannah.	No. of Villages.	Total Area in Square Miles.	Population.			Highest Jumma.	Cost of Establishment per Annum.	Per Centage of charge on Jumma.
				Agricultural.	Non-Agricultural.	Total.			
Koelsah, ..	1. Atrowleeah	236	77	22,103	8,249	30,352	57,662	1,824	3 2¼
	2. Koelsah,	270	99	25,540	9,219	34,759	61,842	1,824	2 15¼
	3. Maharajgunje,	175	48	11,778	4,040	15,818	27,920	1,824	6 8¼
Suggree,	4. Belemagunje,	227	81	26,981	7,139	34,120	48,855	600	1 3½
	5. Uzmutgurh,	449	149	38,121	12,260	50,381	78,791	1,284	1 12
Ghosee, ..	6. Ghosee, ..	375	164	23,832	18,840	42,672	94,079	1,284	1 5¼
	7. Muddholan,	327	118	29,696	9,028	38,724	58,887-6	1,284	2 2¼
Mahol, ..	8. Mahol, ..	283	148	42,477	17,867	60,344	69,634	1,824	2 9¼
	9. Deedargunje,	251	113	27,263	9,059	36,322	98,077	1,824	1 13¼
Nizamabad, ..	10. Kutwalleea Azimgurh,	313	141	27,399	17,125	44,524	69,706	1,380	1 15¼
	11. Nizamabad,	455	291	47,236	13,059	60,295	95,954	1,272	1 5¼
	12. Gunnupoor,	382	298	59,699	19,099	78,798	1,41,751	1,536	1 1¼
Cheriakote	13. Cheriakote,	356	97	22,782	9,890	32,672	59,380	1,404	2 6¼
	14. Belhabans,	163	61	11,915	2,978	14,893	39,937	1,356	3 6
Mahomedabad, ..	15. Moobaruckpoor,	400	137	29,238	20,056	49,294	79,143	1,284	1 9¼
	16. Kopah, ..	150	70	15,602	15,013	30,615	39,777	1,284	3 3
	17. Mhow, ..	273	124	28,925	10,024	38,949	66,557	1,284	1 14¾
Deogaon, ..	18. Deogaon,	456	195	63,517	22,506	86,023	1,18,689	1,320	1 1¼
	Total, ...	5,541	2,121	5,54,104	2,25,451	7,79,555	13,06,642	25,692	1 15¼

Note.—The area, population, and Jumma are entered as in the preceding Tables.

IV.

Table showing the strength and charge of the Local Establishment on the Jumma of the Chuklah.

Nature of Establishments.	No. of unarmed persons on the Estabt.	No. of Armed persons on the Estabt.	Total of persons.	Cost of Estabt.	Per Centage of charge upon a Jumma of 13,06,642.	Remarks.
Sudr. Revenue Establishment,	49	..	49	28,356	2 2¼	This is exclusive of the Abkaree, Stamps, & Opium.
Mofussil Tehseeldaree Estabt.	126	328	484	42,936	3 4½	
Total Revenue Establishment,	175	328	503	71,292	5 7¼	This excludes the Jail Estabt. & Burkundaze Guard.
Sudr. Magisterial Estabt.	45	159	204	34,120	2 9¾	
Mofussil Police Estabt.	18	360	378	25,692	1 15½	
Total Magisterial Estabt.	63	519	582	59,812	4 9¼	
Sudr. Judicial Establishment,	41	15	56	39,512	3 0¼	
Mofussil Judicial Estabt.	6	..	6	3,660	0 4½	
Total Judicial Establishment,	47	15	62	43,172	3 4¾	
Grand Total,....	285	862	1,147	1,74,276	13 5¼	

N. B. The Darogahs, Jemadars, Sowars, and Burkundazes are reckoned as armed, the rest are unarmed. The Sudder Establishments show that portion of the charge which should be debited to the Chuklah Pergunnahs, exclusive of Pergunnahs Secunderpoor, and Budaon, which are part of the permanently settled province of Benares. The charge has been distributed on the Jumma, but the total of persons is shown. The higher Civil Establishments are assumed at the average salaries of the respective grades, thus, 1 Collector and Magistrate at 22,500 per annum. 1 Judicial Magistrate and Deputy Collector at 12,000 per annum. 1 Judge at 30,000 per annum. 1 Principal Sudder Ameen at 7,200 per annum. 1 Native Deputy Collector at 4,800 per annum. 2 Moonsiffs at 1830 per annum.

6th. The chief natural products of the district are Sugar, Indigo, and Opium. Comparatively little grain is grown in the district, seldom sufficient for the support of the whole population, which is partly dependent upon importation from the neighbouring district of Goruckpore, or from Behar, or the Western Provinces, as the crops in either direction may happen to have been the most plentiful. The river

Goggra is the general channel for these importations. Golahs, or grain markets, are established all along the course of this stream, and the supplies are thence poured in, as necessary, to all the manufacturing towns in the district.

7th. Sugar is the staple produce. It is cultivated throughout, and always yields a high rent, generally 12 or 15 rupees the acre; but in some parts of Pergunnah Mahol, where the finest Sugar land is situated, it runs as high as 30 or 40 rupees the acre. An effort has been made to ascertain the value of the Sugar annually produced in the district, founded on a calculation of the quantity of land shown by the settlement returns to be under Sugar cultivation, and the average produce of the land. This estimate gives a total area of 1,02,735 beegahs (acres 57,877), the produce of which is 12,32,707 Ghazeepore maunds (11,55,663 cwt.) of Goor, or inspissated juice. This may be valued at 33,89,946 rupees, and is calculated to yield 3,08,177 maunds (2,88,916 cwt.) of Sugar of 1st quality, and 1,23,271 maunds (1,15,989 cwt.) of Sugar of 2nd quality, and to give the manufacturers a net profit of 4,12,957 rupees. For this estimate, I am indebted to the ingenuity and research of my successor in the collectorship of the district, Mr. R. Montgomery. As the calculation is curious, I have given it in detail in the Appendix (A.)

	F.	A.D.		
Price of Goor in	1236	1829..12	Srs. for the rupee	8th. The price of Sugar has varied considerably during the last few years. When that article formed part of the Company's investment, about 5 or
,,	1237	1830..12	,,	
,,	1238	1831..14	,,	
,,	1239	1832..17	,,	
,,	1240	1833..23	,,	
,,	1241	1834..20	,,	
,,	1242	1835..16	,,	
,,	1243	1836..16	,,	
,,	1244	1837..12	,,	

6,00,000 were advanced to persons in the district for its supply, and then prices were steady; but when this demand was suddenly stopped in 1832-3, and the Company withdrew from the market, prices of course fell, and some distress was consequently experienced till the trade found new channels. Lately, the reduction in England of the duties on East India Sugar, has occasioned much speculation, and a great rise of prices. It is not likely they will continue long at the same standard, but a much lower rate will handsomely remunerate the cultivator, and lead to considerable extention of the cultivation.

9th. The immediate effect of the demand for the home market has been to draw down to Calcutta a great deal of the Sugar, which till lately had found its way to Mirzapore, and thence to the markets of

Central India, and the Western Provinces. The total quantity for which certificates have been granted under Act XXXII, 1836, from the time the provisions of that enactment came into operation in December 1836, till November 1837, was 1,58,162 maunds. All the raw produce of the district is manufactured into Sugar within its limits, and exported in the refined state. European skill or capital has not yet been largely or successfully employed in the manufacture: this is generally conducted at small native factories scattered all over the districts. There are scarcely any large villages without one or two of these factories, which afford a ready market for the produce of the surrounding country. The largest native factory belongs to Deep Chund Suhoo, and is situated at Decha, in Pergunnah Nizamabad, about eight miles south east of Azimgurh. The same person has also a similarly large factory at Muchaitee in Jaunpore, just on the southern border of Pergunnah Deogaon, whence a great deal of the raw material is drawn. It should however be remarked, that the juice is expressed, and inspissated, i.e. formed into Goor, by every cultivator himself, at simple mills, and boilers erected in the immediate neighbourhood of his field. The manufacturer confines his labour to converting this Goor into refined Sugar.

10th. Indigo was some years ago much more cultivated than it is at present: the quantity now annually manufactured is about 1,500 maunds. It is reckoned a good quality in the market, and brings a good price, but still neither the climate nor soil is peculiarly adapted to the production of the plant; and whilst Sugar is so much in demand, advances can readily be obtained by the cultivators on Sugar-cane crops, and the facilities of procuring land for Indigo will be diminished. Since, however, Europeans have been permitted to hold land, several villages, or parts of villages, have passed into the hands of the Indigo planters by sale, or mortgage, and in these Indigo can be cultivated to any extent that may be found profitable.

11th. About 1,700 maunds of Opium are annually produced in the district. This, at the cost price of 300 rupees per maund, would bring upwards of 5,00,000 of rupees into the hands of the agriculturists. The cultivation of the Poppy is at present confined almost entirely to the *Keorees*, a class of industrious cultivators, some of whom are to be found in almost every large village in the district, conducting the garden cultivation in its immediate precincts. They are generally tenants with rights of occupancy, or at will, and are very seldom themselves proprietors of the land. They constitute almost a separate community, having *Mahtoes* or Sirdars from amongst their own body, through

whom their concerns, especially in the Opium department, are managed. The cultivation of the Poppy might be very much increased, and the north eastern parts of the district are peculiarly adapted for its production; but the expenses attending the cultivation are heavy, and now that Sugar yields so profitable a return, and is so much in demand, it is not probable that the production will be greatly increased at the present price. The cultivation is also generally unpopular; the Zemindar is jealous of his *Keorees* taking advances from the Opium department, because it renders them, in some measure, independent of him, and introduces into the village another authority than his own. The *Keorees* themselves would like the employment, if they were always sure of protection from the exactions of the inferior officers of the department. This of course depends upon the nature and vigilance of the superintendence exercised over the department. At present the organization is far more complete and efficient than it has been for some time.

12th. The manufactures of the district are a considerable source of wealth to it. These consist mainly of Cotton cloths, but some Silk goods are also made, and others, containing a mixture of Cotton and Silk, commonly called Tussur. The demand for these goods used to be very great, but is now much diminished by the competition of English goods. English twist is also very extensively introduced into the market, and has in a great measure supplanted the use of the native thread. This again has much injured the quality of the cloth, for though the English is more regular and even in its texture, it is far less durable than the country thread. The Cloth is made at looms erected in the private houses of the weavers, who are congregated in great numbers at some of the principal towns, such as Moobaruckpoor, Kopah, and Mhow, and are also to be found in many large villages in all parts of the district. They are all Mahomedans, a weak and sickly looking people, but mostly possessing fire arms, and very liable to be excited to riot by any thing which affects their religious prejudices. They have of late years been particularly turbulent, in consequence of the spread amongst them of the tenets of Seyud Uhmud. This sect is especially opposed to the ceremonies of the Mohurrum, and the several superstitions which characterize the prevailing belief of the Sheeas; whilst, by its general intolerance, it tends to embroil the whole body of Mussulmans with the Hindoo population.

13th. Every loom pays a small acknowledgment to the Zemindar,

under the title of *Kurgahee* (from *Kurga*, a loom). This is commonly called a tax, but it is more properly a rent, or equivalent for permission to reside on the estate, and obtain the protection of its owner. The payment is very trifling, generally of a few annas on each loom in the year; it is highly prized by the Zemindars, and cheerfully paid by the weavers, when no attempt is made to raise the rate, or to infringe upon the established custom regarding it.

14th. It is calculated that there are 13,682 looms in the district, of which 10,561 are for the manufacture of Cotton, and 3,121 of Silk and Tussur goods. These looms probably produce 10,00,000 of pieces in the year, which may be valued at 23,00,000, and are supposed to yield a net profit of nearly 4,00,000 to the manufacturers. The particulars of this estimate, also furnished to me by the kindness of Mr. Montgomery, will be found in the Appendix (B.) It is not likely to be too high, for the value of the exports in Cloth are supposed to be about 10,00,000 rupees, which would leave only 13,00,000 rupees worth to clothe 8,00,000 of people. None but the more wealthy classes wear any other than the manufactures of the district.

15th. It is not easy to account for the existence of these manufactures, so far inland, and in a country where no Cotton whatever is produced. Their rise was probably occasioned by peculiar encouragement afforded by former Governments; and in Mhow, tradition especially states this to have been the case, when the little Pergunnah formed the appanage of one of the Begums of the imperial house of Delhi, in the reign of the Emperor Shah Jehan. Probably, too, the superior fertility of the soil, the uniformity of the climate, and the exemption of the country from the severe droughts which occasionally lay waste other districts, has contributed to this. The great variation of the price of food in the large grain districts, would tend to discourage the formation of a manufacturing community. The habits which would be naturally engendered in a year of plenty would necessarily cause ruin and emigration in a year of local scarcity. On the other hand, a district which is always dependent on commerce for the support of its redundant population, would never suffer much distress, except in a season of general famine, when the whole country would be reduced to equal misery and destitution.

16th. There is not much trade passing through the district. The Goggra and Goomtee on either side of it, and the Ganges at no great distance, are the great channels of commerce. Some Salt finds its way across from the Ganges to the Goggra, and grain is carried back in return, but this is mostly intended to facilitate the supply of the local

wants of intermediate towns. A considerable quantity of Cotton however passes from Mirzapore, and the markets near Allahabad to Goruckpore, and Nipal through Jaunpore and Azimgurh.

17th. The chief Exports and Imports of Goods may be roughly stated thus, though the latter are evidently much underrated—bullion, in shape of cash remittances by the Government, is not mentioned.

Exports.

Cotton and Silk Piece Goods (entirely in hands of Native traders), ...	10,00,000
Opium, ...	5,09,700
Indigo, ...	2,70,000
Sugar exported by Europeans, ...	19,00,000
Ditto ditto by Natives, ...	3,50,000
Total Rs. ..	40,29,700

Imports.

Raw Cotton, ...	2,15,000
Miscellaneous Spices, &c.	90,000
Grain, ...	9,40,000
Total Rs. ..	12,45,000

18th. The total Receipts and Disbursements of the Government Treasury in the whole district (including Pergunnahs Secunderpore, and Badaon of the province of Benares,) are Rs. 19,64,150, thus,

Receipts.

Land Revenue, ...	14,77,150
Stamps, ...	35,000
Abkaree, ...	72,000
Miscellaneous, ...	3,80,000
Total Rs.	19,64,150

Disbursements.

Local Expenditure, ...	5,63,000
By Bills, ...	8,27,150
Transported to Benares, ...	5,74,000
Total Rs.	19,64,150

It is only during the last year that so much money has been drawn from the district by bills, and that is occasioned by speculation in Sugar, which is generally paid by bills on the Collector, drawn either direct from Calcutta, or intermediately from Ghazeepore, Benares, or Mirzapore.

19th. The inhabitants of the district are generally very illiterate. The Rajpoots, who constitute the great mass of proprietors, are seldom able to read or write. Endeavours have been frequently made to obtain returns of village schools, but these have been very unsatisfactory. Indeed there are very few professed instructors of youth; nor is instruction regularly afforded to the youth of any part of the country, except at the Sudder station and its immediate neighbourhood, where the Residents have established schools. In other parts of the country the village *Putwaree*, or some other *Lallah*, occasionally gives instructions in Hindee as it suits his leisure or inclination, and his neighbours will occasionally send their children, and acknowledge his services by small presents, perhaps of money, or more probably grain or other agricultural produce. All Brahmins of any learning have a few disciples attached to them, but this sort of instruction is not professedly for gain. It is restricted to their own class, and partakes greatly of the nature of a religious duty.

20th. The returns show seventy-seven schools, where instruction is given for remuneration. The number of scholars is supposed to be 674, and the total monthly emoluments of the teachers about 300 Rs. per mensem. The great majority of these are for the instruction of Mahomedans in Arabic, Persian, or Oordoo. There are also supposed to be 134 schools where instruction is given to 1,334 scholars, without any express remuneration to the teacher, all of which, with one exception, are kept by Brahmins for giving instruction in Sanscrit.

21st. Having thus generally stated the extent, disposition, and resources of the district, I proceed to explain the nature of the landed tenures, as they are now found to exist. In doing this it will be necessary first to decide in whom the proprietary right to the land actually rests.

22nd. In discussing this subject, it is of little use to view it theoretically, and to refer to the maxims and principles laid down in books of law. Supposing these to be ever so clear and decisive (which they by no means are) it is questionable if they ever were acted upon with any consistency; or supposing them at any time to have been acted upon, the period has long since passed away, and the disuse into which they have fallen for centuries has practically annulled them. It is of

more use to look to the actual state of things, and ascertain as far as may be possible, what that was in any one part of the country, or at any particular time. It is my purpose to do this as far as I may be able, for the tract of country to which this report refers, and for such period as we may have tradition or history to direct us.

23rd. The whole of Azimgurh must have originally formed part of Rama's kingdom of Ujodhya. The inhabitants of that time are called by the present race of men *Rajburs* and *Assoors*. The latter is evidently only another instance of the tendency to attribute every thing that is old or wonderful to superhuman agency. There are still existing a race of men called *Burs*, a very low class, who generally tend swine. They are said to be the descendants of the aborigines, and it is not impossible they may be; but they have lost all traces of their original character, and I do not know a single instance of their now possessing proprietary right.

24th. The inhabitants of the country, by whatever name they are distinguished, were a powerful and industrious race, as is evident by the large works they have left behind them. Immense mud forts still exist, such as are seen at Hurbunspoor and Oonchagaon, near Azimgurh, and at Ghosee, which are attributed to them; and traces of a large excavation still exist, which seems to have connected the Koonwur and Munghai Nuddees, and is known by the name of Asooraeen. The Huree Bandh at Ameinuggur, in Pergunnah Nizamabad, is another work generally attributed to them.

25th. These people were overwhelmed by incursions of Rajpoots, who seem to have come over from the west, under different leaders, and to have completely subjugated the country. Whether the incursions were successive or simultaneous, or at what time they took place, there are no means of ascertaining. An inscription found in Deogaon shows that in the middle of the twelfth century that Pergunnah was included in the dominions of the king of Canoje, and was probably a favorite place of resort for the court.

26th. These invasions of the Rajpoots are the foundation of the present existing proprietary right in the land. Different tribes located themselves in different spots. The descendants of each chief multiplied, till at length, in some instances, they displaced all other occupants of the land, or at least assumed to themselves all proprietary privileges. The stocks were numerous: each Tuppah, or sub-division of a Pergunnah, is marked by the prevalence of its own stock. These all pretend to trace their origin to a single person, who first conquered the country. Thus, the Gautum Rajpoots came from the Dooab un-

der two leaders Gen Rai and Men Rai. They established themselves in Tuppah Dowlutabad, and there founded two villages. Mehannuggur was the residence of Men Rai, and Goura of Gen Rai. To one of these two stocks all the Gautums of that part of the country trace their origin. It is impossible to say when this incursion took place, but circumstances will afterwards be stated, which show that in the beginning of the seventeenth century, the family had increased to such an extent, that some of the stock were obliged to leave the country in search of subsistence.

27th. It is not to be supposed that the families regularly multiplied without interruption from the first stock to the present day. Violent changes constantly took place. Tribes were swept away by the incursions of foreigners, or by the aggressions of their neighbours. During the fifteenth century the kings of the Sherki dynasty from Juanpoor, exercised great sway in the district. Parts of the country seem indeed to have been held by Mahomedans. Pergunnah Belhabans is said to have been peopled by Mahomedans, who were exterminated by an incursion of the Bais Rajpoots, who are at present in exclusive possession of the country. Thus too Tuppah Shah Suleempoor, in Pergunnah Deogaon, seems both from its name and the numerous Mahomedan tombs still existing, to have been not very long ago in the possession of Mussulmans, though it is held entirely by a race of Bhooimjars, who came originally from Goruckpore, and are of the same stock as the Rajah of Benares.

28th. The occasional incursions and supremacy of the Mussulmans is strongly marked in different parts of the country by the existence of shrines and tombs of Shuheed Murds, who are believed to have fallen in contests with the inhabitants of the country, either Hindoos, if in later times, or evil genii, if in older times. Thus the town of Mhow obtains its distinctive title of 'Nath Bhunjun' from the exploit of a saint called Mullick Tahir, who expelled the evil genius Deo Nauth, and made the country habitable by men; or, in other words, was some adventurer, who drove out the original inhabitants, and located a colony of Mussulmans. The followers of Mullick Tahir have however long since given place to a colony of Dhoonwar Rajpoots, and no trace of the exploit now remains but the old shrine, with numerous other graves strewed around it, where the devotion of all classes, Hindoos as well as Mahomedans, constantly keeps a light burning. Instances similar to this are numerous.

29th. Near the close of the 16th century a member of the Gautum family of Rajpoots in Tuppah Dowlutabad, Pergunnah Nizamabad,

who had left his native village of Mehannuggur, in consequence of the smallness of his share being insufficient for his support, found employment in the imperial court at Delhi, turned Mussulman, became an eunuch of the palace, and obtained in the fourth year of Jehangire (A.D. 1609,) a grant of the Zemindarry of 22 Pergunnahs, in which Chuklah Azimgurh was included.

Rajah Ublumán Sing
Alee Mahomed Nadir Dowlut Khan,
Rajah Hurbuns,
Rajah Dhurnee Dhur,
Rajah Azim Khan,
Rajah Ikram Khan,
Baboo Mahabut Khan,
Rajah Iradut Khan,
Rajah Jehan Khan,
Rajah Azim Khan.

From A.D. 1609 to A.D. 1771, nine successions of these Rajahs are said to have taken place. Their power appears to have varied greatly. Their rule is said to have been very oppressive. They never paid more than 50,000 to 1,00,000 Rupees into the imperial treasury, and even this was often withheld, and the efforts of the Rajahs are said to have been uniformly directed to the annihilation of all other rights but their own. The Canoongoes were proscribed, and all Pergunnah records that could be found destroyed. Hence none are now found of a date belonging to this period, or prior to it. The Rajahs were first much resisted by the other tribes of Rajpoots, and it was not till after much fighting that Azim Khan, the fourth of the race, about A.D. 1620, overcame the Bais Rajpoots of Uthaisee, and founded the Fort of Azimgurh. Mahabut Khan (said to have reigned from 1677 to 1722) was the most powerful, and established his authority from the Goggra to the Ganges. In 1771, the Nuwab of Oude, Shoojahood Dowlah, resumed the grant, expelled and proscribed the family, and governed the district by Chukladars, till it was ceded to the British in 1801.

30th. Subsequently to our acquisition of the country, the descendants of this line sued the Government in the Provincial Court of Benares for their restoration to the Zemindarry. The suit was of course thrown out, but in the course of it the claimants produced an Altumgha Sunnud as the foundation of their right, granted in the fourth year of Jehangire. Doubts may be entertained of the authenticity of this document, but there is no reason to doubt that some such Sunnud was given, and the document produced in Court, if not the identical one, was probably an imitation of it, or at least was drawn up in the form which such grants generally assume. As the document possesses some interest, from the light it is calculated to throw on the proper meaning of the much contested term *Zemindar* I subjoin a copy of it, and a translation in plain English, divested of the redundancies of the original.

درینوقت میمنت اقتران فرمان
والاشان واجب الاذعان صادر شده که
اشمن سنگه زمیدار منه نگر نظام آباد
از بنده مقبول بارگاه والاجاه بدین
اسلام درآمد نظر براستحقاق بخطاب
راجه نادر دولتخان ممتاز شده بست
ودو پرگنه از صوبه اله آباد ابتدا،
نبیسان خریف سنحا قوئیل حسب
الضمن مرحمت فرمودیم باید که
فرزندان نامدار کامگار و الاتبار و وز
راي ذوي الاقتدار و حکام کرام و عمال
کفایت فرجام و متصدیان مهمات
ديواني و متکفلان معاملات سلطاني و
جاگیرداران حال و استقبال ابدا ومو
بدا در استقرار و استمرار این حکم
مقدس و معلی کوشیده برزمینداري
پرگنات بخطاب مذکوره نسلا بعد
نسل و بطنا بعد بطن خالدا و مخلدا
بحال و برقرار داشته بزرهاي
مشخص مال واجب سرکار مبلغ یک
لکهه و بست وپنجهزار روپیه نانکار بر
قبولیت مجرا داده باشند که مع
سرحد و سردیهه وغیره ابواب
زمینداري صرف معشیت خود
پردازد و از تصادم تغییر و تبدیل این
امر مقدس مصیون و محروس داشته
سند مجدد نطلبند و از یرلیغ کرامت
تبلیغ والا انحراف نه ورزند یازدهم
شهر ربیع الاخر سنه چهارم جلوس فقط

It has happened in this propitious time that Ubhinan Sing, Zemindar of Mehannuggur in Nizamabad, has embraced Islamism, and been honored with the title of Rajah Nadir Dowlut Khan. We have therefore bestowed upon him 22 Pergunnahs in Soobah Allahabad from the commencement of the Khureef Crop, and according to the specification below. Our illustrious sons, and rulers of the provinces, and Mootsuddies must ever use their strongest endeavors perpetually to maintain this grant, and confirm the Zemindaree of the above Pergunnahs to the afore-mentioned person, and his descendants, for ever. They will deduct 1,25,000 Rupees, as his Nankar from the total Jumma payable to the Government, in order that he may spend it, and the fixed allowance per village and per centage in the Jumma and other Zemindarry dues for his support. This Sunnud will not require renewal. Dated Rubeeool Akhir 15th, in the 4th year of the reign.

ضمن مینو یسد

پرگنات حسب ضمن بست دو
پرگنه نانکاریک لک ۲۰ هزار پرگنه
نظام آباد پرگنه کورّیه سلهني پرگنه
گوپال پور پرگنه سگري پرگنه
محمد آباد پرگنه گهوسي پرگنه
جکسر پرگنه نتّهو پور پرگنه چریا
کوتَ پرگنه قربات متو پرگنه بلها
بانس پرگنه دیو گانو پرگنه نانا تَ
بهنجن پرگنه شادیاباد پرگنه
بهیري آباد پرگنه پچو تر پرگنه
سیدپور بتري پرگنه ظهور آباد
پرگنه بهد اون ابواب زمینداري
وغیره سي صد یکروپیه

Specification on the reverse.

Pergunnahs 22, Nizamabad, Kowreea Tilhenee, Gopalpore, Suggree, Mahomedabad, Gohna, Ghosee, Chukeysur, Nuthoopoor, Cheriakote, Keriat Mittoo, Belhabans, Deogaon, Mownat, Bhunjun, Shadeeabad, Behreeabad, Puchotur, Seydpoor, Bittree, Zuhoorabab, Bhudaon.

Nankar 1,25,000 Rupees, Zemindarry dues per village 2 Rs., per cent 1 Rs.

31st. If the holder of this Sunnud had been in power when we first acquired the country, it is not improbable that we should have acknowledged him sole proprietor of all this tract of country, and have reduced the real proprietors to the rank of mere tenants.

32nd. From these revolutions the Pergunnah of Mahol was generally exempted. A family of Seyuds obtained possession of it in a Zemindarry grant at a very early period, the tradition of which is now lost. They contrived to locate themselves firmly in the Pergunnah. Branches of them entirely suppressed the Rajpoot communities in many of the villages. The Rajah was dispossessed of the government by the Nuwab of Oude, previous to our acquisition of the country, but he still retains many villages as his private property. Some of these have passed from him, by sale for arrears of revenue, to the hands of the notorious Amil Sheo Lall Dhoobe, and yet in some of these villages the old Rajpoot communities exist, though they have long been broken down, and the members reduced to the rank of mere cultivators on fixed rates. Instances sometimes occur of the strength with which ancient proprietary associations are maintained, even long after all exercise of the rights has ceased. The two contiguous villages of Mohujah and Newadah had long been held by

the Mahol Rajah. Soon after the cession they passed, by public sale, into the hands of Sheo Lall Dhoobe. No proprietary right had ever been claimed by the village communities, and yet in 1834 they fought regarding their common boundary, and lives were lost on both sides.

33rd. The above historical facts have been mentioned merely to illustrate the mode in which the proprietary right was generally exercised, and how this right was transferred, and the present existing diversity of tenure introduced. I suppose the original conquest of the Rajpoots to have been the general foundation of the existing proprietary right in the soil. That right we often still find exercised in its original purity, but in many places no trace of it can be found. A few instances in which the mode of its annihilation, and the rise of a subsequent right is known, may account for these irregularities.

34th. Tuppah Hurbunspoor extends along the south bank of the Touse, opposite to Azimgurh. It was held originally by a tribe of Sukrawar Rajpoots, a remnant of whom still survive in Oonchagaon. In order to strengthen their fort, the Rajahs of Azimgurh determined to lay waste a great part of this tract, and encourage the growth of jungle upon it. The Sukrawars were accordingly expelled, and the country depopulated. The soil however is rich, and in time, when the whim of the day had passed away, it was considered desirable to bring this tract again under cultivation. The Sukrawars were, however, then broken and ruined, and in no condition to assert their rights in opposition to the Rajah of the time. In this space, accordingly, to the south of Azimgurh, in its immediate vicinity, we find all sorts of tenures existing. The village of Siddharee was given to Baboo Baz Bahadoor, a member of the family, and added to his Talookah. He located cultivators upon it, and it is now his absolute property. A portion of land, formerly called Sarungdurpoor, was given to Ikram Khan, who brought it into cultivation, and there located a body of Puleear Rajpoots from Sumaidah, in Tuppah Behrozpoor, Pergunnah Mahomedabad, and called the place Ikrampoor. He passed away, and the resident Rajpoots became recognized as the proprietors. Thus too Jaffurpoor is formed out of the land of the old villages of Pooranahpoor, Bullaisur, and Golwarah. Baboo Jaffur Khan brought the land into cultivation, and located some Dhoonwar Rajpoots, who afterwards, on the extinction of his family, became the proprietors. Another tract of this waste land was assigned to some Buneeahs, who brought it into cultivation, built a large village, and have left traces of their industry and wealth in numerous topes, and some artificial bunds for irrigation. This village was called Bodhaitah.* In the days of the Chukladars it was plunder-

ed, and the inhabitants massacred; since which time it has remained without one inhabitant (Be-chiragh). In default of other claimants, the Canoongoe of the Pergunnah engaged for it, and now holds it in proprietary right as his Zemindarry. A Bunniah in Azimgurh, who claims his descent from the old proprietors, attempted to establish his right in the Special Commission Court, but failed. Ask any intelligent resident in the neighbourhood, who is the rightful Zemindar?—he he will answer, the Bunniah. Question him more strictly, and he will admit the prior right of the Sukrawar Rajpoots. Tradition reaches no higher.

35th. Achar, and its dependant villages in Pergunnah Mhownat Bhunjun, was held by a tribe of Kaut Rajpoots. The Dhoonwars of the neighbouring estate of Khabseh were the more powerful: they attacked, and massacred most of them. The little mud Ghurree is still shown where the last who held their ground were put to death. This took place only a few years before the cession. Some of the family fled into the neighbouring district of Ghazeepore, then in our possession, and have in vain since attempted to recover their rights.

36th. A family of Chundel Rajpoots emigrated from the Juanpore district and settled in Pergunnah Nuthoopore, where they acquired much land about the place where the Durgah of Kullooah Bund has since flourished. A chur was subsequently thrown up between the Kuttooby Talow and the river Goggra. Of this chur the Chundels took possession. Their prosperity kept pace with the increase of the chur, and the Chundels of Doobarree are now one of the most flourishing clans. Their Talookah till lately was included in Pergunnah Secunderpore; it has now been annexed to Nuthoopore.

37th. In many cases the origin of the present Zemindarry right has been the rent-free grant of waste land to the ancestors of the present proprietors, such grant having been made by the actual sovereign, the Emperor of Delhi, or his local representative. The grantee brought the land into cultivation, and as the former proprietors had passed away, on resumption of the grant by some succeeding ruler, was acknowledged as proprietor. Some terms of this sort are said to have had their origin in grants by the Sherki sovereigns of Juanpore.

38th. The appropriation of waste lands was sometimes, however, founded on mere acts of usurpation by powerful individuals or communities, or has grown up by sufferance. Thus the powerful Pulwars of Kowreeah have encroached on the neighbouring forest land in Pergunnah Nizamabad. Their occupation of Kadarampoor is a case in point. The rise of some Aheer communities appears to illustrate the latter mode of appropriation noted above. These people

were familiar with the forest, fixed their residence on some favorable spot, and began to cultivate; and when a settlement came to be made, appeared to be the most convenient persons to admit to engagements for the land. Thus the villages of Tumbolee in Tuppah Phurchuk Havelee, Pergunnahs Nizamabad and Muhason, in Tuppah Chitpore, Pergunnah Mahomedabad, are held by Aheers.

39th. These instances serve to show in what way the original proprietary right, resting on conquest, may have often terminated, and been replaced by another right founded on grant of the ruling power, actual usurpation, or voluntary act, sanctioned by sufferance. It is immaterial now to discuss the validity or the legality of the circumstances, which originally created the right previous to our rule; it was asserted and maintained whenever there was strength enough to support its assertion. Since our rule commenced, it has been recognized, legalized, and consolidated. When no other private rights are prejudiced by the recognition, its admission must be beneficial.

40th. Under the circumstances stated above, the proof of the proprietary right is of very different degrees and nature.

41st. It is of course strongest where the village communities have flourished for centuries, and where they have been powerful enough to hold together, and to keep out intruders. In other cases, where the origin of the right is not so clear, we find it settled on the prescription of many years, and capable of immediate adoption. Generally in the formation of a settlement, possession is the point regarded, and if this be for only a few years, it is still sufficient to give a title, till a better be shown; it being always borne in mind, that possession is only good as far as it goes, and that a Talookdar who has been recorded by us as Zemindar, may still have below him bodies of people, exercising full proprietary rights, and entitled to the recognition and confirmation of all those rights. In the settlement however of Towfeer Mouzahs, and of resumed Maaffees, the greatest difficulty often occurs. Here the proprietary right has been long in abeyance. All around a proprietary right is exercised, and has been so for ages, so that there is every reason to believe it has existed on the spot in question, but it has been in abeyance once, and perhaps disputed for so many years as to be difficult of determination. If wells have been dug, or trees planted, or bunds erected on the spot, these are always appealed to as proofs of old proprietary right. The enjoyment of the fruit of the trees, or of the fish of the ponds, or of any other of the spontaneous products of the soil, are adduced as proofs of possession of that right. It is a common and convenient practice to refer to the Canoongoe's records, though these are of doubtful authority. Under present rules the case

is referred to a jury, but even they are often perplexed, and I have known cases where contending parties have agreed to leave the determination of the point to lot.

42nd. In rent-free lands some neighbouring Zemindar has generally acquired some recognition of his proprietary right from the Maafeedar, either by direct money payment, or by an allowance of land called *dobiswee* (i. e. equal to two biswas in the beegah, or ten per cent. of the whole area) free from the payment of rent, or by cultivating a large portion of the land on favorable terms. Generally too the Zemindar appropriates to himself the *sayer*, or spontaneous productions of the land, but all these of course often depend on the relative strength of the Maafeedar and of the claimant of the Zemindarry.

43rd. In the large *co-parcenery* villages, intricate questions sometimes are raised by the claimants of shares, and it becomes difficult to decide whether a man is a sharer or not. A member of a village community often falls into distress, either because his share is really inadequate to his support, or because he has become impoverished by his own fault, or by misfortune. Under these circumstances he may make over his share to a *co-parcener*, or let it lie waste. In either case he may leave the village, or continue to reside in it. If he continue to reside in the village, he may still have his share of the *sayer*, though he have no cultivation. If a partition of waste land attached to a village takes place, he immediately asserts his claim, and if the settling officer were to take the determination on himself, he would find the task no easy one.

44th. I have thus endeavored to show the probable origin of private proprietary right in the land, and of the forms under which it is found to be at present exercised. I will proceed next to classify these forms, and to point out the principal features which characterize them.

45th. The proprietary right in the land may rest either in a single individual, or in a community of people. This community may divide amongst themselves the profits of the estate either according to their ancestral shares, or according to some arbitrary rule, having reference to the quantity of land which each member cultivates. Of the two latter tenures the former has been sometimes styled the *Zemindarry*, the latter the *Putteedaree*, or *Bhyachara*. None of these terms have local application. The term *Zemindar* is generally applied in the district to any one having a proprietary right in the land, whilst *Putteedar* is restricted to those members of the village community who are not under engagements directly with the Government. The term *Bhyachara* is not known.

46th. We will proceed to consider separately the three classes of tenures mentioned above. First, those where the proprietary right rests in a single individual.

47th. All these are evidently liable to partition under the existing laws, in the course of the succeeding generations. The vesting of the entire right in an individual is rather incidental than natural to the tenure, and yet deserves special notice, because it is generally created in a way that brings with it special rights and relations. The sole proprietors of villages are mostly those who have purchased them at public sale for arrears of revenue, or under decrees of Court, or by private contract.

48th. Purchasers by public auction, on account of arrears of rent, must be held to have become possessed of all of what is commonly termed the Zemindarry right. From the cultivated land they may collect the established and fair rates: of the uncultivated land they have the entire disposal. The *Sayer*, including the *Phulkur*, the *Bunhur*, the *Julhur*, and whatever Zemindarry cesses are levied in the village, of right belong to them, as does also the whole of the timber, which is not the personal property of the resident who planted it, or his heir. With the former non-proprietary cultivators the relations of the purchaser are well defined. He steps into the place of the former proprietors, and is entitled to collect whatever they used to collect before. From the old proprietors he is entitled to demand for their Seer the average rate paid in the village, or its neighbourhood, for similar land, by similar classes of cultivators, though this may be some times difficult to determine immediately.

49th. An individual may have become possessed of a village under sale in satisfaction of decrees of Court, and this is more frequently the case than might be expected, even where the former proprietors were numerous. A wealthy and intriguing man who once gets a footing in a village will soon contrive to bring the interests of all the others to sale, and by purchasing them, become himself the sole proprietor. The right thus acquired is evidently more absolute than where it rests on sale for arrears of revenue, though the latter gives the better title. The latter absolutely transfers only the Zemindarry right, guaranteed by the State against all other claimants; the former gives the whole of the rights and interests of the persons whose estates were sold, but liable to challenge by any other claimants. In the latter case, the old proprietors retain their rights as cultivators; in the former, they lose them, and sink to the ranks of mere tenants at will.

50th. Purchases under special contract are of course ruled by the terms of the contract; but here, as well as in the case of sales under

decrees of Court, our mistaken practice has introduced much confusion. It became customary to consider the recorded Malgoozar the absolute proprietor of the whole share, for which he paid the revenue; and hence the sale of his rights and interests was held to be a conveyance of the whole share; a transfer of the names was made in the Collector's books, or, in technical terms, *Kharij Dakhil* was taken out, and it became no easy matter to determine what really was transferred. No doubt recorded Malgoozars have often taken advantage of this misapprehension of their rights seriously to injure their co-parceners and enrich themselves at their expense, but great injustice has also been caused the other way. A *Putee* has raised money on mortgage, or stood security in the name of its recorded Malgoozar, and received all the benefit accruing from either transaction; and afterwards, when the terms of the contract have come to be enforced against them, have endeavored to throw the whole weight on the Sudder Malgoozar alone. The Government has frequently been thus a loser by accepting a Sudder Malgoozar as security in the full amount of his recorded liability. Cases of this sort must of course be decided each on their separate merits. I would only mention one rule, which I have found arbitrators adopt. Co-parceners living together, and holding their property jointly and undividedly, are held to be bound by the act of their recorded managers. The presumption in such cases is strongly in favor of common agreement to the act, and they must be very strong and peculiar circumstances which could establish a right of exemption from all the liabilities implied in the deed.

51st. Talookahs are not always held by an individual, but they frequently are held either by one person or by a few living together, and exercising their rights as one. Any collection of villages held together, either by one person or by many, is in the common usage of the district called a Talookah; but I employ it here in the more restricted sense in which it is generally received in the Western Provinces, as meaning a collection of villages, each having a separate community of its own, which by some act of the ruling power had been assigned to an individual, who was to collect the revenue from them, and pay over a certain portion of it to the Government.

52nd. Of such Talookahs there are not many in Azimgurh, nor are the few that exist of any great size. Talookah Baz Bahadoor perhaps is the only one which deserves very particular notice. Baboo Baz Bahadoor was a junior member of the family of Gautum Rajahs of Azimgurh, already mentioned. He obtained from the Rajah of the time several villages. Some of them were waste, and he brought them into cultivation; some of the village communities were weak, and

either he hoped to crush them, or they anticipated advantages from being placed under his care. He thus acquired about 20 or 30 villages in different Pergunnahs, and by superior address managed to keep some hold of them till we acquired the country. Our first act was of course to call him Zemindar, and constitute him absolute proprietor of the whole. He himself however was not in a condition to avail himself altogether of the favorable opportunity. He fell into pecuniary difficulties—was obliged for sometime to make over his estates in mortage to a banker, and at the last settlement was unable to enter into engagements himself, and saw many of his villages transferred in farm to the members of the village community. Now in some of these villages the Talookdar was the only claimant of the proprietary right. The lands had been waste, and he had brought them into cultivation at his own cost, and here his recognition as Zemindar was proper. Where, however, the village communities had retained their rights, these were confirmed to them with reservation of a Talookdaree right. Some cases were found in which the Talookdar had never exercised any right whatever over the village, nor derived any profit or emolument from it for many years, although he had all the time been nominal and recorded Zemindar. These were severed from the Talookah and settled with the proprietors.

53rd. If the proprietary right rests in many members of a village community, they many divide the profits according to their ancestral shares, or according to some arbitrary rule regulated by the quantity of land in the cultivation of each proprietor, or, in other words, his Seer land.

54th. When the profits are divided amongst the several co-parceners according to their ancestral shares, they may, or they may not, be cultivators of the land, i. e. the holders of Seer. The simplest form which the case can assume, is when they all live together as a joint undivided family, one person managing the estate for the rest, or appointing a common manager, and dividing the profits at the close of the year. Sometimes they divide the estate, their responsibility continuing joint—sometimes the cultivators only are divided by the Putwaree, each collecting from those assigned to him ; and this assignment may take place annually, or when once made may continue in force till a re-partition is demanded. There are instances where each person collects from each cultivator the portion of the rent which is his share, but this is very uncommon.

55th. When the proprietors cultivate themselves, the case is rather more involved. If the Seer of each parcener bears the same proportion to the total quantity of Seer land, that his share does to the

whole, the Seer may be thrown out of account and the collections from the Assamees divided amongst them, according to their shares. This however is seldom the case. It is more usual to levy a rate on the Seer land, either the same that it would bear if cultivated by Assamees, or some other fixed and arbitrary rate, generally a low and favorable one. The village accounts being thus made up, the profits are divided according to the shares. In this case, if the rate levied on the Seer land is the same as on the Assamees land each parcener can take up as much land as he likes as his Seer, otherwise there are constant bickerings on the subject, for of course the increase of Seer cultivation diminishes the rent roll.

56th. When however the proprietors live separate, but divide the profits amongst them, it is by far the most common to divide the estate, and each person to manage his own share as he likes. In course of time, however, inequalities arise either in the quality of the land in one share by superior management, or by the gradual encroachments of one share on the common waste land. This gives rise to violent disputes—some claiming re-partition, others resisting it. These disputes are commonly called in the district, "*kum a beshee*," i. e. where the contending parties affirm that the shares are less or more one than another. The man who thinks he has less than his right, claims to pay not according to his ancestral share, but according to his possession. This is not admitted by the other, and default ensues. Estates have thus been often brought to the hammer, at the time when sales by auction were the favourite means of realizing the public demand. Now they constantly lead to attachment of the estate. The only effectual method of terminating such disputes is by re-partition of the whole, presuming, of course, that participation according to ancestral share be an admitted feature of the tenure. Clause 2, Section XII, Regulation VII, 1822, evidently contemplates cases of this sort, and confers the necessary power on the settling officers. Disputes of this nature are most common in the Pergunnahs of Kowreeah, Gopalpoor, and Atrowleeah Tilhenee, and they also occur in Deogaon.

57th. But where the proprietary right rests in a community, the profits of the estate are often enjoyed not according to the ancestral shares, but according to some arbitrary apportionment on the Seer land of each proprietor. This apportionment of profit shows itself in the form of a reduced rate of assessment on the Seer land. In such cases the Government revenue is said to be paid or made up by a *bachh* on the Seer. These tenures of course suppose that each proprietor is himself a cultivator, though it may so happen, and sometimes

does, that the proprietor is not a cultivator, but has acquired the share by purchase, public or private, from a cultivating proprietor. Where the profits of the estate are divided according to ancestral shares, the Seer of a Zemindar is that which he has under his own cultivation, i. e. which he has cultivated at his own cost, and by his own capital. In tenures however of the kind which we are now considering, the word Seer acquires as it were an artificial meaning. It is that portion of the land in the possession of a sharer on which he pays the *bach,h,* and which when compared with the total amount of Seer in the village, represents his interest in the estate. It depends upon the custom of the estate whether this be all or any part in his actual cultivation, or whether he have any other cultivation in the village than this. Instances are not very common where the sharer cultivates no part of his Seer, and they generally arise, as above stated, out of forced, or voluntary transfers from cultivating proprietors. It is common however for the proprietor to under-let a part of his Seer, obtaining from the tenant the full Ryottee rates, and paying himself only according to the *bach,h.* Instances are not common where the proprietors cultivate more than their Seer. One singular case deserves special notice. In Mowzah Oomahpoor, Pergunnah Mhownat Bhunjun, thirty-six beegahs were set apart in the village, and each sharer's right was determined by the portion of this thirty-six beegahs which he cultivated. It was his Seer, but besides this he might cultivate as much more of the village as he liked at the common Ryottee rates, and so all the sharers did to a considerable extent. Other instances probably might be found where sharers cultivated the land of other sharers, or the common lands of the villages, at the usual Ryottee rates, but they do not come permanently into notice.

58th. It is evident that the Seer land may in such case bear any proportion to the Ryottee. It may be very small, and the great bulk of the estate may be cultivated by persons claiming no proprietary rights in the estate, or it may absorb the whole of the estate, which in that case is parcelled out amongst the several co-parceners as their Seer. The latter is commonly the case in the old Rajpoot communities, which have been strong enough to resist all the changes which violence or fraud so often effect. In Tuppahs Chowree and Koobah, in Pergunnah Deogaon, and in a great part of Pergunnah Belhabans this prevails. The members of the Rajpoot communities are very numerous and strong. They will not admit that there are any cultivators but themselves, and record the land as their Seer, each man paying a proportionate share of the Jumma according to the *bach,h.* There is strong reason to believe that this is by no means so generally the

case as they aver. They have no idea that an arrangement of this sort enables them more effectually to conceal the real resources of the village, and would be more effective in resisting the inroads or power of an auction purchaser, if any one were to attempt to take their estate at a sale for arrears of revenue. It is certain that many under-let their Seer, and do not cultivate at their own risk. All aver that they give portions of their Seer in payment of service to their ploughmen, herdsmen, and other agricultural labourers. The Putwaree however does not enter these appropriations of the Seer in his accounts: their all appears as Seer, his papers merely showing the extent of each man's Seer, and the portion assessed on him for payment of the Jumma and village expenses. An exception to this may perhaps be said to exist in what are called in Deogaon, Muzhooree Ryots; but these are only persons to whom the village community have made over shares which have lapsed, or are in abeyance from any cause, so that the land may not be waste and leave a heavier burden on the rest of the village. Where the whole of the land is Seer, in these cases the custom which regulates the payments is called *bhaiunsee*, in other places it is called *beegah dam;* in both, the practice is the same. The payments of the early *kists* are made according to a low established rate on the Seer land, and towards the close of the year the whole community assemble to audit the accounts. The village expenses are added to the Government Jumma, and from the total is deducted the payment of the Ryots, if there are any. The remainder is distributed according to the *bachh* upon the owners of the Seer land.

59th. This audit of accounts (or *boojharut*, as it is called) is a most important process to the whole of the community. The right of admission to the audit is the criterion of proprietary right. It may so happen that a proprietor has lost his Seer, either from poverty or its accidental appropriation or destruction. Still he has a voice in the audit, and can claim a scrutiny of the Putwaree's papers. It may so happen that the force or fraud of a part of the community or of an individual in it, has for a course of years kept some of the community from the audit. Such exclusion is fatal to the possession of the party. He is considered as dispossessed.

60th. In a community it must always happen that there are some members of superior intelligence or wealth who obtain a preponderance in the brotherhood. Where so much respectis attached to hereditary right, this influence often descends from father to son, although the descendant may not be distinguished by personal worth. The engagements with Government run in the names of these indivi-

duals, who are commonly styled *Lumberdars* (i. e. bearing the number in the Government Registers). These persons in many parts of the country arrogated to themselves the whole of the proprietary right, and imposing upon the ignorance of the European officers of the Government, succeeded in obtaining recognition of themselves as the owners or Zemindars of the estate, instead of mere managers on the part of the whole community. This however was less the case in Azimgurh than in the other neighbouring districts, especially in the province of Benares. The hereditary right of the managers had not become established, and it had been usual on re-settlement of the estate to alter the name of the manager, and sometimes to increase the number of managers. In the present settlement the question has been set at rest by the filing of an agreement entered into by the whole of the village community, declaring the office to be elective, not hereditary, and the incumbent to be liable to be ousted by the voices of the majority of the *Puttee* or *Thoke* he might represent, on proved mis-management.

61st. Still under any circumstances the audit of the accounts is the fertile source of discord in the community. The village expenses are primarily authorized by the *Lumberdars*, or managers, and as they frequently include fees or bribes to public officers, or other items utterly unsusceptible of proof, are regarded with a very jealous eye by those of the community who are not managers. The power which the Putwaree possesses of fomenting these discords is great, and frequently used in the most injurious manner. It remains to be proved by the result, how far the avowedly elective nature of the office will be now effectual to stifle these dissensions.

62nd. Although, however, the profits of the estate may be divided according to the Seer cultivation of the proprietors, it does not follow that the ancestral sharers are always lost sight of. Sometimes they are, and in such cases the only record of right consists in the Seer, which regulates not only the direct profits arising from cultivation, but also the Sayer, and other proprietary dues. Of this the best instances are Kotelah and Sirsal, and some other villages held by Mahomedan communities in Tuppah Phurchuk Havelee, in Pergunnah Nizamabad. The origin of these communities seems to be totally lost, probably they were originally Hindoo communities, and the genealogy was lost in the confusion which occurred when the Mahomedan faith was adopted.

63rd. In other class of cases the ancestral shares are known and recorded, but profits are still enjoyed according to the Seer. This no doubt has often resulted from over-assessment When the demand

of the Government is excessive, the proprietors are compelled to throw their profits as cultivators into the common fund, and of course those who do not cultivate could not share the profits, whilst amongst the cultivators the profits would be made to correspond with the cultivation. Accordingly we find that since the cession, and especially lately, when the cultivated area, and consequent assets of the village, have increased without a correspondent increase of demand, many changes have taken place, and villages which formerly paid *Beegah dam* (i. e. by a rate on the Seer,) now pay *Khoo taitee* (i. e. according to ancestral shares.)

64th. In the large Rajpoot communities where the whole of the lands are Seer, though the ancestral rights are well known, yet the custom of paying according to the Seer prevails from another cause, viz. from the constant transfer of land or of shares (generally by mortgage, but sometimes by sale) which takes place amongst the several proprietors. The natural multiplication of some branches of the family of course reduces their shares to so small a fraction that some are obliged to seek other modes of subsistence, and leave their shares in the hands of the wealthier members of the family. In other cases, want or temporary distress induces the mortgage of part of the share. The mortgagé generally conveys the land with its portion of the revenue. Instances where the land is mortgaged free of revenue are rare, and the periods of such mortgages are short, nor are they often made, except to regular money dealers, the security of course being bad, as it is liable to be endangered by default of the mortgager. Wherever transfers of this sort are paid amongst the members of the brotherhood, the effect is to lodge large portions of the village in the hands of the wealthier proprietors; and as the mortgages are often not reduced for a long series of years, or perhaps not at all, and are at length lost sight of, the ancestral shares cease to regulate the profits of the proprietors.

65th. I would here remark a curious distinction in these mortgages, which will often be found to afford the clue to disputes amongst the proprietors. Mortgages are either of specific fields, or of shares; the former are called *Khet khut*, the latter *Khoont khut*. A man in distress will mortgage away all his fields one after the other, and at last he makes over his share also; but this transfer, perhaps, carries no land with it. *Khet khut* does not impair the proprietary right of the mortgager, nor does it create any such right in the mortgagee; but the execution of *Khoont khut* at once terminates the connection of the mortgager with the village, and substitutes the mortgagee in his place. The *Khoont khut* probably conveys only a nominal right,

or at least only a right to some small item of Sayer, still it is given with great reluctance, and only under the sternest necessity, and on account of the higher value attached to the privileges it represents, may command a considerable sum.

66th. A similar distinction often exists in titles acquired otherwise than by mortgage. In the village of Burragoon, in Tuppah Chitpoor, Pergunnah Mahomedabad, there were two Puttees in one half of the villages, and only one in the other half. The owners of the latter found themselves numerically the weaker, and fearing that they might be overborne by the two Puttees, summoned a distant member of the family from a neighbouring village, gave him an interest in their half, and had his name inserted in the engagements with Government, together with the representative of their Puttee. There was much waste land in the village, and it was agreed that in each half the waste land was to be apportioned on the Seer of the proprietors. The stranger claimed his share, the owners of the one Puttee resisted it. On further inquiry it was discovered that the stranger had acquired a right to certain fields only, not to a share, he was an owner of *khet* not of *khoont*, and his claim of course fell to the ground. This is an instance of one of the modes, in which the practical bearing of the distinction developes itself.

67th. The mortgage bonds of this sort are frequently worded so as to be deeds of sale, and yet by common custom redemption is allowed. It is astonishing what good faith is generally observed among the members of the large Rajpoot communities regarding these mortgages. A member may have been absent for years, but when he returns to his village in circumstances admitting of the redemption of his share, a meeting of the community is held, his share is determined and given up to him, or the mortgaged fields traced out and restored. An attempt to resist any claim of this sort is highly reprobated amongst the Rajpoots, and indelibly fixes a stain upon the person who resists. Unfortunately the artificial system which is springing up under the influence of our Courts weakens and undermines this generous conduct. Supported by the strong arm of our civil power, a man will now venture to brave the hostility of a community, which in another state of Society, would summarily have enforced its own award.

68th. The man in possession is now supported by the Government till he is ejected by the decree of a Civil Court. The usual way of resisting claims of redemption is either by pleading actual sale, instead of mortgage, and taking shelter under the rule of limitation, which bars the admission of a claim after a certain period, or admit-

ting the mortgage, by bringing forward a long counter-statement of expenses incurred in maintaining possession of the mortgaged lands, or in cultivating them. This account may be swelled to a length far exceeding the value of the land, or the means of the mortgager, and he is at the same time tempted to bring forward a counter-claim for the refund of mesne profits. A case of this sort can only be settled by arbitration. In some parts of the district, as in Tuppahs Chowree and Koobah, Pergunnah Deogaon, the admitted custom is, that redemption takes place on payment of double the mortgage money, and here disputes of this sort are less liable to cause litigation. The village of Ailwul, held by a body of Bissen Rajpoots, which includes a part of the town of Azimgurh itself, is an instance of the ruin which disputes of this sort occasion. Two of the Puttees deserted the village during the oppressions of the period prior to the cession. After that they returned and reclaimed their shares. This was resisted by the remaining proprietor, who had borne all the difficulties which had led to the expulsion of his weaker brothers. The arbitrators absolutely, and free of expense, restored their shares to the claimants. A bloody affray ensued, and the subsequent bitter animosity between the parties compels the constant interference of a Suzawul on the part of the Government to collect the Jumma for the several individuals separately.

69th. The system of *Beegah-dam*, however, very frequently prevails in villages where the shares are the subject of dispute, and here the greatest animosity prevails. The lapse of a share by failure of issue, the conflicting claims of children by different mothers, and the irregular transfer by widows, who may retain the management of their husband's land, are amongst the fruitful sources of these dissensions. Here the contending parties dispute to the utmost the point of inherent right, and when driven from that, the predominant party fall back on the question of village custom; and dropping all mention of the manner in which they originally acquired their large portion of Seer, claim the maintenance of the custom which makes it the criterion of their interest in the village.

70th. The circumstances of Tolookah Sithwul, Tuppah Phurchuk Havelee, Pergunnah Nizamabad, so clearly illustrate many of the curious and difficult questions attending cases of this sort, that I cannot refrain from mentioning it somewhat in detail.

71st. This Talookah originally belonged to a family of Rajpoots, who are now represented by four branches. Between the years 1085 A. F. and 1130 A. F. (A. D. 1677-1722) they sold the estate to a Rance of the reigning family at Azimgurh, who founded on it a Bazar, now called Rance-ka-Serai. It was subsequently re-purchased

for 875 rupees by Tannee Rai, a distant relative of the proprietors, and a resident on the estate, but not himself an owner before that time. From the period of the purchase to the present day the descendants of Tannee Rai held with the heirs of the original proprietors, and all paid *Beegah-dam*, but till sometime after the cession, the family of Tannee Rai remained superior. About the year 1820, the descendants of one of the old branches sued for a quarter share of the estate, and on inspection of the genealogical tree, and a reference to the law officers of the Court, obtained a decree in their favor. In this suit the real question was never brought forward, nor the circumstances explained, under which the Tannee Rai branch was introduced. This decree was never executed, but at the time of settlement, the holders of the decree claimed execution of it from the officer who was conducting the proceedings. They were of course referred back to the Civil Court for an order on the Collector to give possession under the decree, and at the same time a proceeding was held, setting forth all the peculiar features of the case for the consideration of the Court Now we are able to perceive in this particular case the origin of the tenure, and the means whereby a new branch was introduced amongst the community of proprietors, alien to the original stock, but still possessed of rights in reality far stronger than any of the others. The principle of the Civil Court's decision went to the exclusion of these, in fact, the rightful owners, and whose proprietary tenure had been sanctioned by the uninterrupted possession of upwards of 100 years. Similarly good reasons, no doubt, often exist, though the trace of them has been lost, for the numerous apparent anomalies, which exist in tenures of this description. The memory of the transaction had been maintained by its comparatively recent date, the high station of some of the parties concerned, and the existence of the Bazar, which was named in commemoration of it. Similar transactions which were not rendered equally illustrious, were doubtless often forgotten in the convulsions and revolutions of former times.

72nd. It is well to remark some of the incidents of this tenure, and the points wherein they vary from each other.

73rd. Sometimes the Sayer are divided according to hereditary shares, sometimes according to the Seer; the latter prevailing where the shares are acknowledged, the former where they are unknown.

74th. The sharers may themselves cultivate, or they may have the option of under-letting their Seer. This depends more than any thing else on the circumstances in life of the sharers. If they are respectable men, who do not cultivate themselves, or have other means of liveli-

hood, they are accustomed to under-let their Seer; but not if they are themselves of the class of cultivators, and have no other means of occupation. In some instances each person pays the *bach,h* upon his Seer, whether it be cultivated or not; but in general he only pays upon what has been actually cultivated. The former custom is usual when the proprietor is at liberty to under-let his Seer.

75th. The managing proprietor, or Lumberdar of each Puttee, sometimes receives a fixed sum, or pecuniary allowance. This is the case in Sithwul, which has just been mentioned. Each manager there gets 25 Rupees, which is charged to the village expenses. Instances of this are at present rare, because the other unauthorized advantages possessed by the proprietor have generally caused the office to be much an object of desire; now that the situation has become elective, and held only at the pleasure of the community, it is probable that it will more frequently be remunerated by money payments.

76th. Generally the Zemindars are not allowed to extend their Seer without the consent of the community, but where there is much culturable waste land attached to the village, or cultivators are scarce, the rules on this head are little attended to.

77th. In all villages or estates held by communities, exertions have been made in the present settlement to specify and place on record the several peculiarities and incidents of the tenure, which have been referred to above. The members of the community have been called upon voluntarily to define these in a joint deed, executed by as many members of the body as could conveniently be brought together. The points alluded to in these deeds, are the mode in which the profits of the estate are to be divided, and the rules regarding the enjoyment of the Sayer, the cultivation of waste land, the management of Seer land, the rights, privileges, power and tenure of Lumberdars, or managing proprietors. As far as practicable, whenever a desire to that effect has been expressed, the non-proprietary cultivators and the waste land have been divided amongst the several sharers or families of sharers, so that whilst the joint responsibility is maintained, there still exists the greatest encouragement for the improvement of each several share.

78th. I have thus attempted to describe the principal sort of proprietary tenures; but before proceeding to any other branch of the subject, would briefly notice the topographical distribution of property which prevails in different parts of this district, and mention the mode in which the settlement proceedings bear in this respect on the state of property.

79th. The simplest form of an estate is, where an individual,

or community of individuals own the whole of a plat of ground lying within certain limits, and bearing a fixed name, as a Mouzah. This may from time immemorial have borne a single name, and be generally recognized as such, or it may contain within its area two or more Mouzahs, Uslee or Dakhulee, or both, whose separate boundaries have long been lost sight of, and which have become intermingled so as to form one village, probably bearing the double name.

80th. The estate however may comprise two or more such Mouzahs, and these may be situated together or at a distance from each other.

81st. The ancestors of many of the Rajpoot communities were possessed of large tracts of land containing many villages. As their descendants multiplied, this tract of land was subdivided, and formed into separate Mehals. This subdivision sometimes was effected so as to assign whole Mouzahs to different branches of the family. It was seldom, however, especially when the subdivision was amongst many sharers, that the property could be so divided. In this case, perhaps, some entire Mouzahs were given to each branch of the family, and the inequalities thence arising were made good in the division of some Mouzahs held jointly by all, or else each Mouzah was divided so that every branch of the family should have a portion. The whole Mouzahs, or portions of Mouzahs, belonging to each branch, were collected together, and made into one Mehal, or estate. But in the Mouzahs held jointly, the division probably was not in distinct portions, but field by field, or as it is commonly called, *Khet Bhut*. Now these fields sometimes became the subject of sale from one person to another, and the purchaser might call the purchased field by the name of his own Mouzah. It thus happens that many Mouzahs in Tuppah Chowree, Pergunnah Deogaon, contain within them fields known by the name of other Mouzahs, perhaps two or three miles distant, and have attached to them fields in other Mouzahs at an equally great distance. In Tuppah Koobah, Pergunnah Deogaon, the case was still more involved by the circumstance, that sets of fields in several Mouzahs, belonging to different branches of the family, bore distinct names. This distinction existed sometimes in the Government records, and not in common usage, sometimes in both.

82nd. Now in all cases of this sort, the system of survey which has been followed is the most convenient which could have been devised. The professional survey gives the locality of the villages, or of the plots of ground constituting the site and the bulk of the village, whilst the native field maps give the several fields within the circuit of each village. These fields can be distinguished by different colors

according to the different Mehals to which they are attached; and the fair proportion of Jumma allotted to the Mouzah, may be readily assigned to each field, or knot of fields. The fragments of villages thus assessed may be grouped together in Mehals, so as to suit general convenience, and without any trouble to the revenue officers of the Government, or any risk to the interests of the Government.

83rd. It may be useful to attempt a definition of these two terms, a *Mouzah*, or village, and a *Mehal*, or estate.

84th. A *Mouzah*, or village, is one or more parcels of land called by a certain name, of fixed limits, and known locality, neither of which are liable to change. At the time of settlement, each Mouzah has a name and number assigned to it in the Government lists, and must so remain till the ensuing settlement, or till, for any special reason, it should appear fit, under express orders from the Government, to break up or alter the arrangement of the Mouzahs.

85th. A *Mehal*, or estate, consists of one or more Mouzahs, or a part or parts of one or more Mouzahs, covered by one engagement with the Government, or *Durkhaust*, and belonging to one individual or body of persons, who are jointly responsible for the Jumma assessed upon the whole. These are liable to constant variations, according as transfers of property may take place. An annual adjustment of Mehals at the time of making up the annual *kistbundee* if done with discretion, and under certain precautions, will be found very conducive to the comfort of the people, and the convenience of the Government officer.

86th. I would now proceed to notice the right possessed by non-proprietary cultivators, i. e. cultivators not under engagements with the Government themselves, or through their representative. These may be divided into,

V. p. 23, Gov. Genl's. minute of Sept. 26, 1833.

First,—Those having an hereditary and transferable right to hold their land at a fixed rate.

Second.—Those having a right of occupancy at a fixed rate, either for a certain period or during their own lives, or those of their immediate descendants.

Thirdly,—Mere tenants at will.

87th. Under the first term I would include all holders of resumed *Maaffees*, with whom such an arrangement has been expressly concluded by the Collector at the time of settlement, and generally those who by purchase, gift, or special compact, have obtained rights of this nature from the Zemindars, such as Bisweedars, Sunkullupdars, the holders of land at reduced rates, or rent free, as security for loans, the holders of land on special terms in lieu of proprietary claims on the estate. These persons may be, as it happens, themselves cultivators or

may have cultivators under them. At the time of settlement the extent of land held by them, and the conditions of their tenure, have been clearly recorded. The proprietor is of course responsible to the Government for the Jumma fairly assignable to their holding, but he may sue them summarily for the amount, and on failure of payment may oust them or bring their tenures to sale. It may happen, and it frequently does happen, especially in Talookahs, that a whole Mouzah may thus be held as an under tenure by the old proprietors, who are responsible to the Talookdar and not to the Government, and who yet may manage the village concerns according to established custom as a proprietary body. The provisions of Act VIII. of 1835, which authorizes the sale of under tenures of this sort, on failure to pay the amount decreed in a summary suit, afford considerable facilities for the realization of the rents from tenures of this description.

88th. In the second class may be placed the former proprietors of estates sold by auction for arrears of rent, as regarded their Seer land—ousted proprietors, or old claimants of proprietary right, as regards the land they have long had in possession, and generally those who, whether actually resident in the village, or otherwise, may be proved to have long held the same land on the same terms for a course of years. The period which constitutes such prescriptive right has been no where settled. It has been held, that land so possessed since the cession may come within this class. A shorter period however might fairly be assigned, and probably the Civil Courts would recognize the term of twelve years as sufficient to constitute the claim. It is not unfrequently the case that tenures of this sort originate in contracts entered into by the Zemindars themselves, with cultivators whom they may engage to bring waste land into tillage.

89th. Now it is evident that all tenures of this kind are liable to adjustment at the time of settlement. No proprietor is at liberty to fix rates which should hold good beyond the term of his own tenure, or lease, nor would the settling officer be justified in recognizing rates which fall below the average of the Government demand, or the fair proportion of assessment which may be levied from the fields in question. It is sufficient that the fair rate fixed at the time of settlement should be invariable during its duration, and that the extent of land thus held, with the rate and right of permanency, should be clearly defined. Of course if the holders of this land extend their cultivation, and take other fields than those which they are recorded to possess, they do not carry their privileges with them, but must make their own terms with the Zemindars for their new requisitions.

90th. The most perplexing cases of this sort which are likely to

occur, have reference to estates formerly held by large bodies of cultivating proprietors, which are brought to public sale for arrears of Government revenue. In such cases it is only the proprietary right of the defaulters which is extinguished, their rights as cultivators remain intact. They are still entitled to cultivate their Seer land at a fixed rate, but the rate requires to be defined. Before the present settlement there was the greatest difficulty in deciding cases of this sort. The Putwaree's papers, supposing them perfectly genuine, show only the extent of each Zemindar's Seer and the *bach,h* he had hitherto paid. But the extent was stated in an arbitrary Beegah, commonly called the Bhaiunsee Beegah, much larger than the ordinary standard Beegah, being used only amongst the brotherhood, where relative and not absolute area was the only requisite. In order then fairly to fix rates for the Seer land, it was requisite that the auction purchaser should first measure the land, and then determine the average rates which were paid by other cultivators for similar land. It was seldom, in former times, that auction purchasers were able to accomplish this. Any attempt to measure the lands of a turbulent village community would have inevitably led to a breach of the peace and bloodshed, and the loss to the proprietor would have been immense. The matter used generally to end in a compromise, which of course was more or less favorable to the purchaser according to the strength or influence of the two parties. The rate once fixed, and in general it was a very low one, the efforts of the old proprietors were always directed to including in their Seer the best, and richest Ryottee land. Hence the rental was soon reduced so low as to yield no profit to the Zemindar, and ultimately, in all probability, the estate was returned on the hands of Government as over-assessed. No other purchaser would of course come forward, a Government Suzawul was helpless, and unless some great exertions were made by the officers of Government, the deterioration of the estate was permanent.

91st. Talookah Oonhaitch, formerly included in Pergunnah Puchotur, Zillah Ghazeepoor, illustrates the process. It was permanently settled in 1197 F., but broke down in 1223, and for many years had been held *kham* by Government at a considerable annual loss. It has now been re-settled with the former village communities at the old Jumma, and arrangements made with the proprietors for the repayment of the balances by instalments within twenty years. The Jumma, and the instalments have now been regularly paid two years, without the smallest default. The estate has since been transferred to Azimgurh, and forms part of Tuppah Purduha, Pergunnah Mahomedabad.

92nd. The case under the new settlement will be very different. In all estates held by cultivating bodies of proprietors, the custom of *bachh* only is recorded regarding the Seer. There is no necessity for vexing or alarming the proprietors by fixing Ryottee rates on their Seer. If therefore the estate be brought to sale by public auction, there will not be found any rates fixed on the Seer. But still its extent and locality will be certain, and the rates paid by other cultivators of similar rank in life for similar land will be found recorded. There are generally in Azimgurh two rates of rent for the same land, varying according to the rank in life of the cultivators. The respectable, or *Ushraf*, pay less than the lower classes, or *Urzal*. The Zemindars would of course pay the *Ushraf* rates.

93rd. The cause or origin of this distinction is not very clear, but reasons may be alleged in its justification. The *Ushraf* are generally Brahmins or Rajpoots, who are connected with the Zemindars by ties of religion, family connexion, or friendship, and hence are somewhat favored; besides which their respectability gives better security for payment. On the other hand, the *Urzal*, consist of Bhurs, Chumars, and low caste persons, who are generally located on the estate at some expense of capital, and are liable at any time to be left entirely dependant on the Zemindars, who must either support them during a season of scarcity or see his estate depopulated, and his future sources of profit destroyed.

94th. The third class, or tenants at will, consist mostly of those who are styled *Urzal* in the preceding paragraph. They neither have nor assert in general any rights, other than the will of the Zemindar. They take what land he gives them, and pay the utmost that they can, either in money or in kind. Besides their direct contributions to his rental, they render him many personal services. If Kuhars, they carry his palankeen, merely receiving in return food to support them during the time. Other classes bring him wood, tend his cattle, or perform numerous other similar services for very inadequate remuneration. Under former Governments this power was no doubt recognized, and permitted. They were then predial slaves, who were beaten without mercy for misconduct, and were liable to be pursued, and brought back if they attempted to escape. Their state is now much improved. The power is now conventional. A Chumar can now sue his Zemindar in the Criminal Court for an assault, and if detained against his will, can bring his action for false imprisonment. He can even recover in a Civil Court the wages of labor performed. Nothing vexes or annoys the Zemindars in our whole system, so much as this. It has struck at the root of a power, which has long

been exercised most tyrannically, and yet so strong is the force of habit and custom, that often as the power of the Zemindar is still abused, it is very rarely that they are brought into Court to answer for their misconduct.

95th. The foundation on which the right of the Zemindar now avowedly rests, is that of pecuniary obligation. He expends capital in locating the cultivator in the village, he builds his house, feeds him till the harvest time, supplies him with seed, grain, and implements of husbandry. On all these, an exorbitant interest is charged, and in consideration of the pecuniary obligation thus incurred, the services of the man are exacted. Hence the connexion is rather personal than resulting from the tenure of the land, and various circumstances support this view. In mortgages those rights are seldom, if ever, transferred; in private sales very rarely, unless specified; in public sales by authority for arrears of revenue, never. Hence an auction purchaser never acquires any rights over the tenants at will of a former Zemindar, and thus the Zemindar always struggles to include all such cultivation under the term of his Seer. In the partition of an estate, each Puttee keeps its own Ryots, and sometimes the most violent disputes exist as to the right to certain Ryots.

96th. An instance may go far towards exemplifying these customs. In the partition of a village in Nizamabad, held by Rajpoots a dispute arose regarding the right to an Aheer. Each party claimed the man as his own Assamee, and wished his name to be inserted in the list of his own Puttee. Both claimants, and the man himself came forward. The facts of the case were admitted by all. A's ancestors had first located the man in the village, given him his house, supported him, and for a long time retained his services—such as the first day's ploughing of the season, the first day's use of his bullocks in the Sugar Mill; the usual petty offerings of grain, molasses, &c. To improve his cultivation the man had dug a well, for which purpose he borrowed money from a Mahajun. A, was in reduced circumstances, and could not pay the debt. The creditor pressed for payment, and at last B came forward, paid the debt, and subsequently claimed the services of the man, who now left his former house, and resided in one assigned him by B. The man himself, apparently a respectable and sensible cultivator, never thought of denying the obligations of his situation, but said that on A's inability to support him his services were transferred to B. The matter was referred to several respectable Zemindars, who were present, and they unanimously and at once decided that A's right was indefeasible, except by his own transfer to B, and that the Aheer was consequently still bound to

render as before all the usual service to A, whilst B might claim in liquidation of the new debt, whatever else the Aheer might be able to do. This decision was communicated to the parties; the Aheer was registered as A's Assamee, and all parties went away apparently satisfied that the case had been fully heard.

97th. There are however many varieties of this class. In proportion as they are good cultivators, and raised above the menial castes, they acquire by prescription, rights which at length become valuable. The Keorees are an instance of this. They are by far the best cultivators, and they excel in gardening. A Zemindar is always glad to get some of them located in his village. He treats them liberally, because they improve the ground by constantly manuring it, and pay him high rates, and that punctually. Hence their cultivation is never interferred with. They get as much as they like, and are allowed to keep it as long as they will. The self-interest of the Zemindars would always be sufficient to protect them, except against sallies of passion. Lately however the independance of this class has been established by the rapid spread of Poppy cultivation in the district. The Keorees are the only class of people who will produce Opium. By taking advances from the Opium Department, and putting themselves under the protection of that powerful establishment, they have quite freed themselves from any dependance on the Zemindars. It is needless to say, that nothing is consequently more odious to the opulent and powerful Zemindars than this Department.

98th. It is clear that non-proprietary cultivators of this third class by long prescription would rise to the second class, and acquire the right of holding their land at fixed rates.

99th. The better to define and secure these rights, it has been one great object of the settlement proceedings to form an accurate record of each of these classes, according to their several designations. In the two first classes, the extent of their cultivation and rate of payment has been determined; and in the third, the land actually held, and the rate actually paid recorded; this rental thus formed by the village Putwaree, in the presence of as many members of the community as may be on the spot, has been afterwards advertized for information in the village, and at the place where it was drawn out, a time fixed for hearing objections, and at the close of that time, the question has been finally disposed of. Whenever the prevailing rates may have been reduced below the fair Pergunnah average, from collusion, partiality, by special contract, or other cause, it has been sometimes necessary to re-adjust and fix the rates, which may be hereafter demanded.

100th. The future maintenance of those arrangements must be left to

the Courts of Law, but it is well to see how the present practice of the Courts affects them. Summary suits for rent will be decided according to these rates, unless proof be adduced that they have been set aside by the Dewanny Courts, or altered by voluntary agreement; and such voluntary agreement should never be admitted on the denial of either party, except under the clearest documentary proof, or alteration of the rates previously made by both parties in the register of the village. Any cultivator forcibly dispossessed of the land he holds, according to the register, might sue summarily before the Collector for re-instatement, to whatever class he might belong, and would be re-instated accordingly. A summary process is provided to maintain a cultivator in possession against his Zemindar, but no summary process for ejecting a tenant at will is open to the Zemindar. If any Ryot fails immediately to liquidate a demand for rent, adjudged against him in a summary process by the revenue authorities, he is liable to ejectment, and his land is then made over to the Zemindar. Tenants at will seldom resist the requisitions of those who are really their Zemindars, that is, who claim the supremacy which has been before described; but few would yield up their possession in favor of an auction purchaser. In such cases, then, although the Zemindar possesses legally the right of ousting the tenant at will, he can only legally enforce it through a regular suit. The Courts also can of course always take cognizance of claims to be removed from one class of cultivators to another. It is however very questionable how far they could interfere in altering the rates fixed by the revenue officer, unless on pleas originating subsequently to the settlement. They could at least only take cognizance of the question as between man and man, between the Zemindar and the Ryot, as it might be affected by contracts existing between them. They could not positively alter any rate fixed by the Collector. If the estate were held *kham*, or farmed, or sold by the Government in consequence of default, the settlement rates might be demanded, notwithstanding the decree of the Court. If this were not the case, the rental might be reduced below the Government demand, and the interference of the Civil Courts might be thus exercised in regulating the Jumma, which it is an established principle that they have no power to call in question.

101st. If it were desired to introduce the European system of farming, or, in Indian parlance, to make the whole lands of the village Seer, this could only be effected by purchasing up the rights of the two first classes, and by purchasing out, or ejecting, the last class, probably by long and expensive litigation. The insuperable aversion

which the upper classes *(Ushraf)* have to engage with their own hands in any agricultural operations, would render it very difficult to persuade them to part with their rights.

102nd. It is necessary to allude here to the great number of summary suits regarding the payment of rent, which are instituted in this district. The number is still increasing, and the causes which have produced so much litigation deserve note.

Number of Suits instituted in the three first quarters of
1823— 374
1833— 647
1834— 358
1835— 675
1836— 882
1837—1305

First,—The operations of the Special Commission under Regulation I, 1821, and I, 1823, for the reversal of fraudulent sales, and transfers of property ; was one of the chief causes. In the early period of our rule the district suffered exceedingly from the effects of our Code. This was hastily introduced, immediately on the cession, and gave a rich harvest to numerous intriguers, who poured in from the neighbouring districts which had been longer under our rule, and were better accustomed to the tricks and chicanery, which an artificial system of the sort is likely to produce amongst an illiterate people. The choice too of some of the first agents for introducing the new system appears to have been unfortunate. The natural result was, that extensive frauds were perpetrated both in the registration of owners of estates at the time of the first settlement, and subsequently in the transfer of property under forced and collusive sales. To remedy this state of things was highly desirable, and the remedy ought to have been promptly administered immediately the evil was discovered. As it turned out, the attempted remedy was almost worse than the evil.

103rd. In 1829, that is, twenty-six years after the commencement of the evil, the Commission was called into operation in the district. Its conduct was entrusted to Mr. R. M. Bird, the Commissioner of Revenue and Circuit for the division, who was perfectly aware of the necessity, and importance of the measure. The Regulations quoted above confer an immense discretionary power, and admit of great latitude of interpretation. Mr. Bird commenced the work with energy, and began to act on the strong views he justly entertained upon the subject. Had these views been then carried through with promptitude and decision, great good might have resulted. An immense number of suits were immediately instituted, but in the mean time a change had taken place in the views of the superior authorities on the subject of this Commission. Some of the first cases decided by Mr. Bird gave rise to much discussion, and were reversed in appeal. No further decisions were passed, and the time of the

Commissioners was speedily so completely occupied with their other duties, that the investigations lay thus in abeyance for seven years, till in 1835 a separate officer was appointed to close the investigations. When this took place, the views which led to the original enactment, had become completely altered, and all the claims which had been kept alive for seven or eight years, were speedily thrown out. In addition to this, the appellate authority, as well as the primary, had become clogged and overwhelmed, till about the same period a special provision was made for the discharge of its functions. Hence many of the claims which had been allowed by the Special Commissioner in the early part of the period between 1829 and 1836, and the parties put in possession accordingly, were disallowed in appeal at the close of the period, and the decree holders again dispossessed, and made to account for mesne profits.

104th. Amongst a people extremely sensitive regarding their rights in landed property, it may well be conceived what injury resulted from operations such as these. It is unnecessary to notice here the evil effects upon the prosperity and morals of the people. Its effect in all estates which had been purchased at public auction for arrears of public revenue (and very numerous they were) shewed itself in the refusal of the members of the old village communities to pay their rents. Hence the proprietor of such an estate was sometimes compelled to file sixty or seventy suits in a single village or Mehal.

105th. *Secondly,*—By far the larger number of suits were instituted in Pergunnah Nizamabad, and many of these resulted from the fiscal mismanagement of the Pergunnah whilst under settlement, from 1822 to 1834. It was the field where every young and inexperienced officer began to make settlements, or to introduce a new system, and hence was the subject of many crude and rash experiments. Amongst these was the arbitrary fixing of rent rates, from which the Government, demand was deducted. In proceedings under Reg. VII, 1822, this was frequently done, and with the most injurious effect. The arbitrary rates could often not be exacted, but they gave the Malgoozar a pretext for demanding them, and consequently involved him in litigation.

106th. *Thirdly,*—The very unsettled state of the landed property was another fruitful source of litigation. Disputes regarding boundaries, and between Putteedars, were constantly thrown into the summary suit file.

107th. *Fourthly,*—But all these causes were ten-fold magnified by the delay which used to occur in the decision of these suits, then falsely called summary. Till the Sudder Board of Revenue took up the subject in 1833 with their wonted energy, suits of this sort used to

remain on the file ten years or more. When the Civil Courts had the charge of the summary file, very few decisions were ever passed, and these few were based on no fixed principles. Contumacious cultivators derided the efforts of the proprietor to compel payment by the institution of summary suits, whilst these were still placed on the file by the disheartened proprietors, lest failure to assert the claim might have compelled reference to a regular suit, which seemed more expensive and still more hopeless of speedy termination.

108th. A recourse to distress and sale of personal property of the tenant was equally fruitless, replevin immediately took place, and further proceeding was stopped till that could be disposed of.

109th. A very different state of things has followed close upon this. Within the last three years summary suits have been decided and enforced, through the agency of the Tuhsildars, with a promptitude never known before. A month or six weeks is the average duration of a suit, and none lie over for more than three months, whilst the Cutcherry of the Tuhsildar is a tribunal at the door of every man. In the mean time, the Special Commission has nearly closed its course, rent rates have been adjusted, and boundary and Putteedar disputes settled. It must also be remembered that the division of property is very minute, the number of subordinate tenures large, and that every effort has been used to induce the Malgoozars to have recourse to summary suits, instead of relying on the irregular and illegal interference which used to be exercised by the Tuhsildars in the adjustment of their Putteedaree disputes, and collection of their rents. When all these things are taken into consideration, it will not perhaps be considered strange that the summary suit file is heavy. It will rather be thought a happy proof of the efficiency of the process, and a sure indication that regularity and legal modes of redress are rapidly taking the place of confusion and misrule.

110th. The state of the rent free lands requires some notice. All the claims to hold land free from the payment of revenue have been investigated and finally disposed of. The quantity resumed and settled is very large. This consisted mostly of unauthorized grants by Amils, or Tuhsildars, or Zemindars, in which the original grantee, however, had generally demised, and the property had devolved upon the heir, contrary even to the terms of the grants. A large portion of the grants had conveyed tracts of waste land which had been brought into cultivation after the commencement of our rule.

111th. An uniform principle regulated the settlement of all these tenures. Possession and the actual state of things was maintained so far as it was unaffected by the assertion of the right of the Govern-

ment to its share of the produce. If any other than the Maafeedar was in possession of the Zemindarry, i. e. the proprietary right, the settlement was made with him. If the Maafeedar had obtained the Zemindarry right by legal transfer or by prescription, the settlement was made with him. If he had not obtained the Zemindarry, but seemed to possess other rights as an under tenant or cultivator, those rights were secured to him on easy terms, and he was protected from any encroachment on the part of the Zemindar, so long as he faithfully performed his part of the contract.

112th. A few tenures were confirmed for life, or in perpetuity. The latter are old religious endowments, which appear to have been held from time immemorial, and to have been respected by all.

113th. The settlement of this province for twenty years has been formed in the seasons 1833-34 to 1856-7, and extends according to the year in which each settlement was formed from A. F. 1241 to 1264. In all, the settlement has been conducted professedly under the system generally designated as that of Regulation IX, 1833. The adjudication and demarcation of village boundaries prior to survey, the measurement both by Ameens and by professional Surveyors, the determination of the Government demand from general considerations of former fiscal history, and comparison with other neighbouring and similar villages, without a minute scrutiny into the assets of each estate, and the subsequent record of proprietary rights and rent rates, are the main features of the system. In particular cases the system may have been a little deviated from, as will hereafter appear, but this arose from peculiar circumstances.

114th. The former assessment was in general light. The country was imperfectly cultivated. There had been no settlement since 1220 F. and subsequent to that period much waste land has been brought into cultivation. There was therefore less caution necessary in fixing the Government demand than where the assessment had formerly been overstrained, and large reductions were called for.

115th. Very few instances of recusance on the part of the Zemindars ever occurred. It is true that the average of the assessment on the cultivated land is not low, but it must be remembered that the land is very valuable, and pays rates generally much higher than elsewhere. Sugar, Indigo, and Opium are the crops which bring the greatest pecuniary return, and it is satisfactory to bear in mind that the rates were assumed about 1833-34, when all these products were in less demand than general. The advances of the Government for Sugar had ceased a little before that period, and materially deranged the market for that article. The failure of the agency houses in Calcutta

had depressed the Indigo market, and the cultivation of Opium even now is less extended than it might be.

116th. The chief labor of the settlement consisted in the difficulty of deciding the numerous boundary disputes, and fixing the relations between the proprietors amongst themselves, or the proprietors on one hand, and the numerous subordinate tenants on the other. The whole area of 2,121 square miles is parcelled out into 5,541 villages, which gives an average of less than 245 acres to each village. When we advert to the former state of this district, and the rapidity with which it has been in our hands, it is not surprizing that numerous disputes should exist between the different villages. The adjudication of these had never yet been attempted on any uniform plan, and it was a task of no small difficulty, in many cases, to reconcile or give effect to the different decisions which had been formerly given; voluntary arbitration between the parties was the means generally employed for determining the boundary, but where the parties would not arbitrate of their own accord, persons were appointed by lot, under the established mode, to settle the dispute.

117th. I cannot say that I contemplate with satisfaction the mode in which this duty has been performed. Too much was left to private arbitration, and the awards thus given were too strictly followed. The venality of the arbitrators became at length notorious, and there were some, who were known to have amassed large sums in this method. When the work was nearly completed, all persons were convinced that the preferable method was to refer as little as possible to arbitration, and in the cases which were so decided, to tie down the arbitrators within the narrowest limits, and to insist upon a prompt decision in the immediate presence of the superintending officer. This plan was pursued very successfully after the completion of the unsettled portion of the district, in the permanently settled Pergunnah of Secunderpore.

118th. Whatever may be the defects of these operations, it is however certain that the amount of good has been enormous, and quite throws the other into the shade. Possession has been scrupulously upheld, so that the main injustice which could ever be inflicted was to transfer more or less of the culturable waste between two interjacent villages to one or the other. To this waste it was seldom that any title could be made good. By no other plan than that prescribed by the system of settlement could these have been ever brought to adjudication. They have now been all decided, marked off, and a record of the boundary formed both by native Ameens in a rough manner, and by professional Surveyors, on scientific principles. It is scarcely

possible hereafter to conceive that any doubt should exist as to the decision, and the real position of the boundary. One cannot but regret that the agents employed in these operations should often have been false and corrupt; but there can be no doubt; that any attempt now to revise these proceedings, or any failure of decision in supporting the demarcation now made, would be attended with the greatest possible evil, and throw the whole district into confusion.

119th. The only authority competent in any way to alter the decisions already given, is the Civil Court in a regular decision. The Courts will now have each case clearly before them, and every possible light will be thrown on its merits. The sound rule to lay down is, that every decision must be confirmed, unless it can be proved that it was unjust, and the right to another boundary established. If this rule be strictly followed, no evil will result.

120th. One great advantage of the system is, that the district is twice visited by the revenue authorities, once before survey, to settle the boundaries, and again after survey to fix the Government demand. The latter is a valuable opportunity to inquire into any cases of alleged hardship or injustice, which occurred in the former operations. This has been always done. The officer who came on the second occasion to form the settlement, was generally of superior experience to the officers employed on the former occasion, and the opportunity seized to examine the former decisions. I can confidently say that no cases have been left, where the correction of apparent partiality would not have violated some important principle, which could not, according to the spirit of the law, or the dictates of sound policy, be shaken without very injurious results.

121st. The adjustment of the right of co-parceners and of the rates payable to them by non-proprietary cultivators, has also been a work of great labor. It has been much increased by the expression of a general wish on the part of the people, subsequently to the settlement, to have their shares in the estate separated, both in the cultivated and culturable parts. This has been very generally done at their own expense, towards which they readily contributed. In such an event, the village has been remeasured; the holding of each person distinguished by a peculiar colour; and new *Khusreh Khuteonee* and *Terij* formed accordingly. Nothing, I believe, has given more satisfaction in the district, or tended more to the security of property, than the way in which this operation has generally been performed.

122nd. The incidental advantages arising out of the present settlement, and the other operations which have been conducted to a close during its progress, may be thus enumerated:—

123rd. The formation of an accurate map of the whole district has enabled the local authorities to fix a regular boundary with the neighbouring districts, and to determine the limits of the several Pergunnahs, Tuhsildaries and Thannah jurisdictions. The greatest possible efficiency has thus been given to the several establishments, and the comfort of the people greatly consulted. The statements inserted after paragraph 5 present a complete view of the organization of the Mofussil establishments of Revenue and Police, which has been thus effected.

124th. The accounts of each village with the Government were adjusted at the time of settlement. Arrangements were made for the liquidation of any outstanding balance of land revenue, or *tuccanee*, or the remission of the demand determined. The items in deposit regarding the village were examined, and either refunded, carried to the account of Government, or otherwise disposed of, as was necessary. The several items standing under the head of law charges, and arising out of previous litigation between the Government officers and the different villages were adjusted. The confusion into which the accounts had fallen, rendered the careful execution of a work like this, at such a period, important in its financial results, and a great accommodation to the people. At the same time it tended to bring more completely before the settlement officers several considerations which were essential to the formation of a right estimate of the capabilities of each village.

125th. The arrangement of villages at the time of settlement, made after the limits of the district and its several subdivisions had been fixed, as shewn in the general statements furnished with the report on each Pergunnah, has also been the basis of a system of registry and record for the whole district. The Pergunnah number attached to each village in the general statement, is the same that is borne by the bundle in the Record Office, which contains all the proceedings that have reference to that village. The lists attached to these bundles are, in fact, registers of all the transactions that have affected each village.

126th. Having thus sketched the general operations pursued in the district, it will be of some practical use to notice the particular degree or method in which they were carried into execution in each Pergunnah. I will endeavour to do this faithfully and impartially, with all the light which subsequent experience has thrown on the earlier operations in the district.

127th. Pergunnah Nizamabad is the largest and most important in the district. It was first selected for settlement soon after the passing of Reg. VII, 1822, and was the field where every young officer

first attempted to make settlements, and obtained his experience. The results, as might be expected, were very incongruous. In 1833-4-5 all these operations were recast on the model adopted on Reg. IX, 1833. The professional survey was conducted by Capt. Simmonds, whilst the field measurement, where it had not been already completed, was conducted by the revenue authorities. One great evil of this was, that the revenue survey, especially on its first commencement in 1833-4, was far from correct. The interior survey, especially, was often considerably in excess of the truth, as is always likely to be the case, when it is not checked by the native field measurements. The culturable land was also given considerably in excess, from an opinion held by the surveyor, that all the land which would produce any thing whatever should be classed under this head.

128th. In estimating the settlement, advertence must always be had to the mode in which the "general statement in acres" was from necessity drawn out, and the averages there exhibited.

129th. The cultivated area was always taken from the measurement on which the settlement was formed. This was frequently many years previous to the professional survey, and exhibited a much smaller cultivated area than was found to exist at the time the settlement was prolonged for the extended period from 1241 to 1262. The prolongation of the settlement was partly thus determined on considerations, which, although they may have influenced the first settlement, were not the foundation of it. The total of the cultivated area there exhibited in the general statement is considerably less than the survey gives, and also below the fact. This of course makes the average rate of assessment higher than it would otherwise have been. The total area was necessarily taken from the survey returns, which were undoubtedly under this head correct.

130th. The diversity of plan and of persons who had conducted the operations in this Pergunnah, produced its natural effect in great inequality of assessment. In the remarks I have made on the errors of inexperienced officers, I by no means except myself from the number. On first joining the district in 1833, with no previous revenue experience, I found the Pergunnah distracted, and almost ruined by the mal-administration of the preceding ten years. Large balances accrued annually, not from over-assessment, but from unadjusted rights and disputed claims. Affrays frequently occurred, from ill-defined boundaries. There were numerous unadjusted claims, and every thing pointed out a state of considerable disorganization. It became an object of great importance to terminate this state of things as soon as possible. At the close of the year the revenue survey commenced, and did

not terminate its operations in the Pergunnah till the end of the next season. It thus happened that this was the first part of the district prepared for settlement, and in addition to the other causes which urged a speedy termination of the settlement, it became necessary at once to enter on the revision and completion of the operations here, or to remain unoccupied. The settlement was completed and reported in the middle of 1835. Two years' experience since then has convinced me that some of the assessments are higher than they ought to have been. Some of the errors were those of my predecessors, which I left uncorrected; some my own, into which I was betrayed either by erroneous surveys, or by the partial assumption and application of averages. I think, however, that these cases are few. During the two years above alluded to, a Jumma of nearly three lacs has been collected, with a real balance of only one or two hundred rupees at the close of the year. Even this has been realized soon after; and in addition, large sums have been collected in each year, the balance of former years. In one instance, a small village was sold for its arrear and fetched a good price, and in another a farming arrangement was made for the share of a defaulter. Both these cases were peculiar, and with exception to them, the whole has been collected by the ordinary methods. Imprisonment of the person, and distress of personal property, have been very rarely resorted to. It is probable that so long as the present high prices of Sugar are maintained, and the demand for Indigo and Opium remain what they are now, little difficulty will be experienced in collecting the revenue during ordinary seasons. Any failure, however, of these sources of profit, or adverse seasons, will probably throw some of the villages, for a time at least, on the hands of Government. It was for some time a question in my own mind, whether I should propose a reduction of the Jumma on a few estates. The remission of 2 or 3,000 rupees on ten or eleven villages would have been all that was required. But after consulting with the most intelligent natives in the district, it seemed best to avoid shaking the confidence of the people in their settlement, or to check the efforts they were rapidly making to improve their estates by extending the cultivation, or increasing the means of irrigation. If the opinion had once prevailed, that default and reluctance to pay might produce a reduction of assessment, these industrious habits would have been checked, and many estates have been injured at a small advantage to a few. The operation too of this principle would have probably been felt in other Pergunnahs where no such inequality existed.

131st. The confusion in this Pergunnah was not confined to the assessment. The demarcation of boundaries was also attended here

with far more difficulty than elsewhere; it had previously been the custom to measure the village before the boundaries were fixed. This pernicious practice had given rise to endless intrigues and chicanery on the part of the native Ameens. The lands of one village had sometimes been measured, or rather the measurement inserted in the papers of another village, and the settlement formed on this measurement. It hence became often necessary before the demarcation of a boundary, to examine many previous proceedings, and refer to voluminous documents. This, and the habit of intrigue andl itigation, which it had fostered amongst the people, rendered the work very tedious and difficult. I fear that in some cases knavery and corruption obtained their ends, and I know not how this could have been avoided. But in every case, a clear decision has been given, a good demarcation on the ground has been made, and a record of the boundary has been formed. The value of this can only be known to those who were acquainted with the previous state of things. It has already in many cases of itself altered the face of the country, and saved many persons from ruin.

132nd. The imperfections of the boundary work in some degree affect the value of the survey, at least in the eastern and southern portions of the Pergunnah, which were surveyed in the first season. The professional survey cannot be there taken as an infallible indication of the boundary, but references must also be had to other documents put up with the proceedings in each case. In the western and northern parts, which were surveyed in the second season, there is little or no fear of error.

133rd. The same imperfections which adhered to the other parts of this settlement, exist also in the record of the fractional shares of proprietors, and in the adjustment of the rent rates. In the previous settlements it had been usual to express the hereditary rights of the proprietors in fractions of a rupee, without ascertaining whether their actual interests in the State did, or ought to correspond with them. Arbitrary rates were also frequently fixed, which never could be paid. Great progress was made by myself in correcting these irregularities, and amending the records. Mr. Montgomery has since been actively employed in the same way, and I trust that all material defects have already been remedied, or will be soon.

134th. The circumstances of Cheriakote and Keriat Mittoo are so similar, that they may be considered together. These were surveyed by Captain Simmonds, and settled by Mr. Montgomery in the season of 1834-5. The culturable area has been often overstated. There is no reason, however, to think that the defects of this survey have produced any evil consequences.

135th. The assessment is light. It has been collected now for two years without any balance, or the smallest difficulty. In June of each year, the whole demand for the Fussly year, beginning on the 1st of October, has been collected.

136th. There is no reason to believe that the boundary work has been otherwise than well done, and that thoroughly. A few cases about which doubts existed, have since been examined and put to rights.

137th. The rights of proprietors and rent rates have been generally recorded, but the complete form, subsequently introduced, was not then in use. Voluntary agreements were not then entered into by the proprietors, and the partition of the waste land in each village amongst the several co-parceners has not been so thoroughly done here as elsewhere. The rule of partition has always been fixed, but that rule has not yet been universally carried into effect.

138th. The survey and settlement of Pergunnah Belhabans were completed in the same season of 1834-5. The survey was conducted under the immediate superintendence of Lieut. Fordyce, then an Assistant to Capt. Simmonds, and was executed in a superior manner. The Pergunnah is held by one large brotherhood of Bais Rajpoots, who agreed to their Jumma in the gross, and distributed it themselves equally on every beegah of cultivation throughout. This singular proceeding was prevented from falling unequally on the several members of the communities, from the circumstance of the property of each being scattered about different Mouzahs, and in the mode generally known as *khet khut*, so that every man had land of each sort. It must however be borne in mind, that this measure has produced a very unequal village assessment, as those which have poor lands are taxed equally with those that contain good lands. Each Mehal must always be held responsible for its Jumma, not each Mouzah.

139th. The assessment is light, but some difficulty will always be experienced in collecting it, for the people are very unruly, and bear a bad reputation in the district. They are said, it is to be feared with reason, to harbour thieves and bad characters of all descriptions, and no doubt to participate in their gains.

140th. Something is wanting in the Pergunnah in working out the principle laid down at the time of settlement regarding the division of the waste land in each village amongst the several Puttees. This has not been regularly enforced, and no doubt cases exist, where an actual partition is necessary, and ought to be immediately carried through.

141st. Pergunnah Deogaon was surveyed by Mr. Terraneau in the season of 1834-5, and settled by myself in 1835-36.

142nd. The boundaries were very well laid down by the Native Deputy Collector, Seyud Nawazish Ali, and the very respectable Tuhsildar, Meer Muxood Ali. The villages were so much broken and intermixed, that this was a work of no ordinary difficulty. It was done not only completely, but with the fewest possible complaints, either on the score of partiality or unnecessary expense.

143rd. This Pergunnah was unfortunately chosen as the one in which a new survey party commenced its operations. The villages often consisted of broken fragments of land, some larger, some smaller, some mere fields, others tracts of cultivated and uncultivated land, scattered about at considerable distances from each other. The only way to survey those villages satisfactorily would have been to make certain defined circuits in different directions, of the ordinary size of villages, and corresponding as nearly as convenient with existing boundaries, to have surveyed the same circuits professionally, and by native Ameens, and after thus testing the accuracy of the latter, to have taken out from the native field maps the several fields or parcels of land constituting each village, and to have added these up as giving the total area. This however was seldom attempted, and where it was tried, was done so incorrectly as to be nugatory. The native measurements were frequently approved, and passed as agreeing with the professional, when the areas surveyed were totally different. The professional survey itself is often grossly incorrect, both in its representation of the cultivation, and its delineation of the boundaries. The native maps have received scarcely any check, several of them are scarcely intelligible, and in many fields belonging to different persons, different Puttees, and even different Mehals, have been grouped together in one number.

144th. I have done what I could to remedy this state of things, by examining the boundaries, making additional native maps where necessary, distributing the fields and holdings afresh. Such inaccuracies in the professional maps as I happened to meet with, were noted on their face, but I well know that there are many which must have escaped me. The total areas were taken from the professional survey, so that the total of the Pergunnah, according to the survey, and according to the settlement papers will agree, but the areas of the several villages will often differ considerably, owing to the adjustments which were found necessary.

145th. This Pergunnah was the highest assessed in the district, and very little increase on the former settlement could be anticipated. Not only was the rate of the former Jumma on the land high, but the land itself is inferior in quality to that of other parts of the dis-

trict, yielding mostly very uncertain rice crops, and the Zemindars are numerous, each holding a small portion of Seer land on which he subsists, whilst from being Rajpoots of high caste, they are unthrifty cultivators. The main object in the settlement was to equalize the assessment, and much has been done towards this. The settlement has perhaps given more satisfaction than any other in the district, and this result was mainly attributable to the impartial, upright, and very conciliatory conduct of the Tuhsildar.

146th. In estimating the character of the settlement by the averages, it must be borne in mind that the cultivated area has certainly been under-measured, and that no land has been put down by the professional survey under the head of culturable. Whatever was not under the plough, or had not evidently been so within the two or three preceding years, was classed as barren waste.

147th. The record of proprietary rights has been carefully, and well done by the Tuhsildar. The Persian papers are very complete, though the English statements have not been as yet drawn out in the form best adapted to elucidate the peculiar tenures of the Pergunnah. These however are now in a course of preparation, on a plan prescribed by the Sudder Board of Revenue subsequently to the conclusion of the proceedings. No difficulty will be experienced in giving the materials any form which may be thought most expedient.

148th. Pergunnah Mahol was surveyed by Lieutenant Fordyce, in the seasons 1834-5 and 1835-6, and settled by Mr. Montgomery, in the latter year.

149th. The boundaries were mostly laid down by the Native Deputy Collector, and by the Tuhsildar, Buksish Ally Khan. The work was not satisfactorily performed. The people are low, and litigious. The Tuhsildar had little experience in the Pergunnah.

150th. The survey was very well conducted, and may be relied upon.

151st. The settlement though showing a high average, is very light, for the land is exceedingly valuable. The finest Sugar land, perhaps, in all India is to be found here.

152. The tenures are simple, being mostly Zemindarry, where the co-parceners held jointly or severally according to their hereditary shares. The point of greatest importance was the formation of good rent rolls to show the rights, holding, and rates of all the non-proprietary cultivators. This has been carefully done by Mr. Montgomery, and these relations are now placed on the best footing. The rent rolls, or *Jummabundee*, were formed after the settlement, drawn up in the common Nagree character, published to those concerned in every possi-

ble way, by personal explanation to as many as were present, and by suspension in the village before the eyes of all; objections against any parts of these were afterwards heard, and orders passed as each case required.

153rd. Pergunnahs Mahomedabad, Gohna, and Mhow were surveyed in the years 1834-5, and 1835-6, and settled by myself in the latter year.

154th. The boundaries were decided and marked off by two Tuhsildars, Ahmed-oolah Khan, and Zuheer-ool-huk, who were there successively under the personal superintendence, first of Mr. Montgomery and Mr. Chester, and latterly of myself. These proceedings were unnecessarily protracted, rendered very expensive to the people, and sometimes in the final result unfair. Great exertions have however been used to render them complete, and to correct any errors that may have been committed. The undertaking was of vital importance to the prosperity of the district, for there is much waste land, the title to which was greatly disputed, of great capability, and now covered with wood, which is in high demand at the Sugar factories scattered all over the district.

155th. The boundaries were often erroneously laid down, and little pains taken to reconcile the professional and *khusreh* maps. The important point to be borne in mind is, that the professional map cannot always in itself, and alone, be held conclusive on the form of a boundary. Before a certain conclusion can be arrived at, the maps of the two continuous Mouzahs must be compared, the proceeding held on the adjudication of the boundaries examined, and reference had to the *khusreh* maps, and any other sketches of the boundary there may be. If the process be carefully conducted, on the occurrence of any dispute it will be impossible to fall into any great error.

156th. The assessment is light, more so than is shown by the averages, for there is good reason to believe that the cultivated land was much under-measured, and the culturable land was avowedly shown as barren waste.

157th. Great exertions were used to make the records of proprietary rights and rent rates as perfect as could be, and sanguine hopes may be entertained, that these are placed on a satisfactory footing.

158th. The Pergunnahs of Gopalpore, Kowreeah, and Atrowleeah Tilhenee were surveyed by Lieut. Fordyce in 1835-6, and settled by Mr. Montgomery in 1836-7. Three large Talookahs had however been previously settled by the late Mr. George Bird, in 1831-2, and the arrangement confirmed by the Government. These were incor-

porated into the present settlement, with no further change than the extension of the period of the lease.

159th. The boundary work was done almost entirely by the Tuhsildar, Sheikh Waheedooz-zuman, with constant supervision and occasional assistance from the Native Deputy Collector, or the European functionaries. It appears to have been very well performed.

160th. The survey was well conducted. These Pergunnahs are undoubtedly the best surveyed in the district.

161st. The assessment is fair and equable. Adverting to the nature and capabilities of the soil, it is low; but if the character of the people and the nature of the tenures is borne in mind, it is quite as high as it ought to be. In comparing the averages of this assessment with those in other Pergunnahs, it must be remembered that here the survey is a very faithful representation of the extent and character of the land, and that therefore the rate of assessment is not actually as much below that of the rest as it appears to be. The Zemindars are high caste, pugnacious Rajpoots, and their tenures *bhyachara*. There are also many Brahmins who hold lands at low rates as under-tenants, and exercise a powerful religious influence over their superstitious landlords. The revenue administration of this district has always been most difficult. The late operations will materially facilitate the collections, but still difficulties must be anticipated. It is only some years of firm and consistent rule, which will suffice to bring the turbulent inhabitants to industrious and regular habits.

162nd. The settlement of Pergunnah Suggree occupied a long period, and was not finally completed till the year 1836-7. Some few settlements were made by Mr. Barlow, under Regulation VII, 1822, but the greatest bulk by Mr. Montgomery, who also recast the prior settlements. The work was completed and reported in 1834, before the introduction of the new system, but the Commissioner judiciously declined forwarding the report then, and desired the whole to be reviewed under the new rule. This was admirably done by Mr. Montgomery.

163rd. The Kishwaree survey was long ago completed by the revenue authorities, so that the Surveyor was relieved from this duty, and desired merely to survey the boundaries, sketching on the geographical features of the country and omitting the interior survey, or that part of the operations which was designed to distinguish the cultivated from the uncultivated lands.

164th. The adjustment of boundaries had formerly, as in Pergunnah Nizamabad, been much mismanaged, but before the approach of the survey these were all definitely settled, and well marked off, so

that no difficulty was experienced. Some of the decisions may, as in other cases, have been unfair, but the survey is now a faithful record of what the decision was. There can never be any doubt hereafter on that score. The professional operations afforded also a complete and very satisfactory proof of the correctness of the former Khusrey survey.

165th. The assessment is light and equable, and has now for three years been collected without any balance. The record of proprietary rights, &c. has been completed on the plan prescribed, and the settlement is now as perfect as of any other of the district; though it has only been brought to this state at a great expense to the people, and with much personal vexation to them.

166th. Pergunnahs Ghosee and Nuthoopoor were surveyed by Mr. Terraneau in 1835-6, and settled in 1836-7 partly by myself and partly by Mr. Montgomery. The boundary work had been slowly advancing for the preceding year or two, but it was completed by the Native Deputy Collector just previous to the survey. The work was ill done. The large quantity of rich land lying waste about different parts of the Pergunnahs rendered it certainly a task of some difficulty, whilst the wealth and intriguing character of some powerful men in the Pergunnahs added to the difficulty of executing the work with fairness to all parties. The evil, instead of being detected and exposed by the survey, was concealed and aggravated by its operations. Not only were the defects of the demarcation concealed, but where the demarcation was plain and evident, and no dispute whatever existed, errors of the most fatal nature were committed in the survey. Had the professional maps been received and recorded without question, the greatest confusion would have ensued. As it was, the assistance of a professional surveyor was obtained. All the maps were carefully reviewed, compared with each other, with the record of the adjudication of the boundary, and with the Ameen's map. Whenever any doubt existed, a personal examination of the boundary and renewal of the demarcation took place. This was superintended either by myself or by Mr. Montgomery. We always found that adequate decisions had been passed, but that these decisions had not always been clearly marked off. The whole has been now carefully corrected, and no future doubts can well arise, as to the position and direction of the boundary. I am however bound to say, that owing to various causes, which it is needless to enumerate here, the decisions have been more influenced by corrupt motives, and are more unfair, than in any other part of the district.

167th. The assessment is light, and will be easily paid, as the soil is very rich, and there is much fine culturable land, which will

rapidly be brought into cultivation. It must also be borne in mind that the cultivation has been under-measured. The rights, &c. of the proprietors have been well recorded, and the subsequent separation of shares generally completed.

168th. The settlement of each Pergunnah has been thus reviewed. Under ordinary seasons, and with good management, I have little doubt of the stability of the whole, with the exception of a few villages in Nizamabad.

169th. If the present demand for the staples of the district, Sugar, Opium, and Indigo, continues undiminished for a few years, the advance of the district in wealth and prosperity will be more than repaid. Its welfare will however depend much for the few first years on the firmness of the civil administration. If the arrangements made at the settlement are disregarded, the boundaries violated, the rights of proprietors and cultivators neglected, and misrule allowed to prevail, great confusion will ensue, industry will be checked, and improvement stopped. The effect also will immediately be felt in the collections of the Government revenue. The number of persons from whom these collections are to be made are numerous, and their rights nicely balanced. Each man now knows what he has to pay, and it will be difficult to make the redundancy of one compensate for the deficiency of another. If rights are usurped, the injured party will be deprived of the power of meeting the demand against him, and a balance will accrue. If hereafter balances should arise in the district, it must be remembered that this may be occasioned by mal-administration as well as by other causes, and is more likely perhaps to do so here than in many other parts of the country.

170th. The Tuhsildaree establishment should not be diminished. It is now strong and well disposed, but this is necessary on account of the minute division of property, and the numerous persons from whom the collections have to be made.

171st. Much increase must not be expected to the present demand. The Pergunnah of Deogaon is settled fully as high as it can ever bear. Much good would arise from its being declared perpetual. The same is the case in Gopalpoor, Kororeeah, and Atroleeah Tilhenee. In Mahol, Cheriakote, Belhabans, and Suggree, the assessment has reached its maximum, or so nearly, that further investigation would not be repaid. In Nizamabad there is still much valuable uncultivated land. The total demand from this Pergunnah will probably never be increased, but its readjustment and fresh distribution after the expiration of the present period of settlement would be a great advantage. In Mahomedabad, Mhow, Ghoosee, and Nuthopoor there is still much

valuable waste land, which will probably be made productive in the course of the present lease. Fifty thousand rupees might thus very probably be added to the rent roll of Government on the renewal of the settlement.

(Signed) J. THOMASON,
Collector of Azimgurh.
Offg. Secy. to the Lt. Govr., N. W. P.

Agra, December 16th, 1837.

Art. II.—*Mr. Hodgson, on Cuculus.*

To the Editor of the Journal of the Asiatic Society.

Sir,—Amongst the numerous new birds forwarded by me to London, some years back, when I was young enough to imagine that learned Societies existed solely for the disinterested promotion of science, was a very singular form combining all the essential internal and external characters of *Cuculus* with the entire aspect of *Dicrurus*.

Unceremoniously as many others of my novelties have been appropriated, this one still, I believe, remains undescribed, and I therefore beg to present to you a description and sketch of it.

Scansores,
Cuculidæ,
Genus *Pseudornis nob*,

Generic character, essential characters of *Cuculus* with the entire aspect of *Dicrurus*. Tail 10, forked. Type *Pseudornis Dicruroïdes nob*. Habitat. The mountains exclusively. Specific character, Black, with a changeable blue or green gloss. Inner wing and tail coverts, and pair of extreme tail feathers, cross barred with white. An oblique white bar across the wings internally, and high up. Bill black. Iris hoary brown. Palate red. Legs and feet blue. 10 to $10\frac{1}{2}$ inches long, whereof the bill is $1\frac{1}{16}$ and the tail $5\frac{1}{2}$ to $5\frac{3}{4}$. Tarsus $\frac{12}{16}$. Long anteal toe $\frac{11}{16}$. Long posteal toe $\frac{9}{16}$. Weight $1\frac{1}{2}$ oz. Sexes alike. General manners of *Cuculus*, but exclusively monticulous and a forester.

Remark.—The bill, tongue, feet, and wings are precisely those of *Cuculus canorus*, with these trivial diversities—if such they can be reckoned—that the wing is hardly so elongated, and the bill is less rounded on the culmen.

The tail consists of ten feathers, and is both in relative size and in form like that of the genus *Dicrurus*; that is to say, it has ten feathers, and is divaricated and forked, though the fork be not deep.



PSEUDORNIS DICRUROIDES NOB.

Type of GENUS PSEUDORNIS NOB. ½ Nat: Size

T. Black Asiatic Lith. Press Calcutta.

There is this difference, however, as compared with the Dicrurine tail, that in our bird the two extreme feathers are much *smaller* than any of the rest; whence the fork of the tail becomes lessened in depth, these plumes not contributing to it.

The singular assumption of the entire aspect of so remote a genus as *Dicrurus* on the part of this strictly Cuculine bird will, I fancy, be generally considered extraordinary; and has suggested the generic name of *Pseudornis* (ψευδοσ falsus) The *Cuculus lugubris*, although described as having a *wedged* tail, will, I think, be found to have a forked one, and to constitute a second species of our proposed new genus, which will be, in that event, placed on a firm basis.

If it be remarked, that supposing *Lugubris* to have really a forked tail, it is, in fact, specifically identical with our bird, why then the specific name *Dicuroïdes* will merge in that of *Lugubris*, but the new type of form may still claim to be recognised, and surely will do so.

The green glossed black plumage and the forked tail, are as universally the marks of the Dicrurine sub-family as they are, I believe, universally excluded from the *Cuculidæ*.

I am, Sir,
Your most obedient servant,
W. B. HODGSON.

Nepal, March, 1839.

ART. III.—*Report on the Coal and Iron Mines of Tálcheer and Ungool, also remarks on the country through which it was necessary to travel in search of those minerals, the produce, inhabitants, nature of the soil, roads, &c. &c. By* Mr. M. KITTOE, *Curator and Librarian Asiatic Society's Museum.*

March 31*st*, 1838.

All necessary preparations having been made, and assistance received from the superintendent tributary Mehauls, I left Cuttack on the 14th March, in company with Mr. R. Beetson, (contractor for the transport of salt from the coast to Calcutta) and proceeded by regular marches through Dhenkennal, direct from Kuckur on the Mahanuddee to the Brahmenee at Atturva, encamping first at Kuckur Govindpoor, and secondly at Deogaon, under the famous hill of Kuppilás, near to the summit of which, at an elevation of 1000 or 1200 feet, is a fine spring of fresh water, round which are several ancient temples built by Pertaub Rudr Deo, king of Kalinga, in the sixteenth century of the Christian era.

From Atturva we proceeded up the south bank of the Brahmenee to Tálcheergurh, where we arrived on the seventh day, encamping at Nadurra. and Kumalung, the distance travelled being 30 Ooriya coss of $2\frac{1}{2}$ miles to the coss on an average.

We halted one day at Tálcheer, and interchanged visits with the Rája (who is a very intelligent man, and has travelled all over India) likewise his eldest son. I presented the old gentleman with a musical snuff-box, with which he was much delighted.

After duly examining the coal beds I proceeded to Mungulpersád, a stockaded village on the borders of Ungool, the distance seven coss in a westerly direction, over an undulating country, with, generally speaking, indifferent soil and much shingle.

We remained one day at this place, and having inspected the coal beds, &c. returned by a more direct (though crooked enough) route through the states of Tálcheer and Ungool, to the bank of the river (at Mungulpoor) along which we proceeded, via Nadurra, Nágnáth, Chundpál, Kapeepoor, to Kewátbund, near to which place the river enters the plains, throwing off that branch called the Kursooa, which is the only navigable channel to the sea. We reached this place on the 26th, thirteen days from the date of our leaving Cuttack.

The country is neither so mountainous nor jungly as it is represented to be, but for the most part, much neglected; although the soil appears generally good, and productive.

The lands in the immediate vicinity of the Brahmenee are very rich. Great quantities of cotton, sugar-cane, castor-oil plant, linseed, &c. &c. are grown for home consumption, as well as for exportation; the chief profits of which are monopolized by the Mukhteears and Survurakars of the states, who farm the villages from the Rája, and make the most of their bargain by extorting the utmost fraction from the cultivators, who are in fact mere slaves; indeed so are all the inhabitants of these hill provinces; they nevertheless seem happy in their poverty and degraded state.

A great deal of very fine tobacco is grown along the banks and on the muddy deposits of the river, and such lands fetch an exceeding high rent; notwithstanding which the profits on this article of commerce are very great.

Wheat and barley are cultivated in small quantities, and what little I saw appeared to grow most luxuriantly; maize, &c. is also grown on the high lands by the meaner classes, but rice is the chief article of food.

The land in Tálcheer and in Ungool is not so good as in Dherkuomál; and the trees are stunted in growth owing to the shingle,

laterite, and sandstone rocks which are near the surface. There is more jungle and waste land on the opposite side of the river.

From the third march from Atturva to the plains (commencing at Kewátbund) the level lands vary much in extent, the hills in some places coming within 3 or 400 yards of the river, and in others, receding for two or three miles, forming no connected chain, but all more or less isolated (apparently of volcanic origin), the land between them being perfectly level, except where ravines or beds of laterite and kunker occur to interrupt it. At Atturva the hills recede gradually, till at Kurugpursád they branch off in a south-westerly direction, through the state of Hindole into Ungool, towards the Mahanudde; the hills on the opposite side of the river also recede in a north westerly direction towards Keonjur and Bounnaragurh.

Shortly before reaching Kurugpursád the country commences to be undulating, and extensive beds of shingle occur, with red marl. Sandstone rocks are met with at Mungulpoor, protruding through the soil, which are very close grained and white; granite also sometimes occurs in huge detached masses, which have a very singular appearance, particularly at Kukurdung, in Ungool, where they rise in detached blocks of sixteen and eighteen feet in height, and of most fantastic shapes, somewhat resembling the Stonehenge. The land on the north bank of the river is likewise undulating, with rocks. No hills of any magnitude are to be found within twenty or thirty miles of Tálcheer and the coal localities visited by me.

From Tálcheergurh to Mungulpersád, a distance of sixteen miles or more, I saw much shingle and rising ground, on which there is iron ore and laterite, also kunker (calcarious nodules) and sandstone rocks. I observed near the different villages much scattered cultivation beneath the sál and other jungle trees, the underwood having been cleared away; this is the consequence of overtaxing the arable and clear lands, and taking nothing for cultivation of this kind, which is little inferior to the best.

There are no wells, and but few tanks throughout the country. Except in the low lands, in the vicinity of the river, water is very scarce, and what little there is, is of bad quality, particularly in Ungool, where some of the wells and tanks contain naphtha.

There is much waste land overgrown with long grass, which affords excellent pasturage for buffaloes and cows; there are consequently very fine herds of both descriptions of cattle, which are far superior to those of the Mogulbundee (or plains). There are but few goats and sheep.

The people of these states are more artful than even the inhabi-

tants of the plains of Oorissa, who are bad enough. Their craftiness is beyond any thing credible. I have travelled a great deal during my residence in India, and had much intercourse with the different classes of natives, but never did I meet with such provoking knaves as the people of the Gurhját (hill states). It is next to impossible to obtain any correct information even on the most trivial subjects. Every question put by a stranger is considered and re-considered, ere a reply is given, and that, too, is an interrogation as to the object you have in asking it. And should you ask the distance from one place to another, you will be answered at random, or told, "I don't know; I have never been there; I was born in this village; so was my father," and such like;—this is to prevent your asking them to go with you and show the path, and if you take them, they will lead you by the most tortuous route.

I was informed that it is more than any ryot's head is worth to give information regarding the internal economy of the state, or about its resources, or, indeed, on any subject. With such people to deal with, it is not surprising that very little information has been gained by me during such a hurried trip. What I have obtained regarding the Hingolae mines, was from an ascetic, to whom I made a suitable present. I also heard of coal and iron mines in Bumurfagurh, from a merchant of Cuttack, and accordingly despatched an intelligent peon to examine them, and to bring specimens, &c.

There is no road along the banks of the Brahmenee, but an irregular and narrow footpath; indeed there are no hackery roads at all. The only road of any consequence is that leading from Cuttack through Dhenkennalgurh, past Kurugpursád and Mungulpoor, and on to Boad; it is tolerably wide and smooth, and is much frequented by Bunjaruhs, who bring cotton, iron, and turmeric in return for salt and tobacco. From Mungulpoor, onwards, the road is nearly due east and west.

Remarks on the Water Carriage for Coal, &c. &c.

The Brahmenee is navigable for good sized boats from the end of June to the middle of December, and sometimes later. Coal could be laden in small canoes and conveyed to Kurugpursád at most seasons of the year indeed. The Dhenkennal boatmen assert that small boats only can navigate the river above that place at any season owing to the numerous rocks; this is however not to be relied upon, for there are but few, which could be removed at a trifling expense.

From Kewatbund (at the edge of the plains) boats and rafts are floated down that branch called the Kursooa.

The furthest point towards the sea to which the coal could be taken is Hunsooagolá, where large sloops anchor. It would be preferable to make this place a depôt, Auligurh being many miles further up the river. It is to these places that Messrs. Beetson's sloops come for salt. There is a bankshall belonging to them at Aul, where sloops are built and repaired. The timber is cut and purchased in Dhenkennal, where it is very cheap, and may be had of any size and quality, viz. sál, sissoo, bijesál, kúrúmb, gírahu, &c. A native contractor offered to carry the coal from Tálcheer to Hunsooagola, at the rate of twenty-five rupees per 100 maunds, or four annas per maund; the boats making three trips each season. The lading is included in this amount. Mr. Beetson however informs me that it could be done for one anna per maund, or, at the utmost, two annas.

From Hunsooa Mr. Beetson would contract to carry the coal to Calcutta, or to any port lower down the coast; and from his experience of the natives of Oorissa, and his industrious habits, I should venture to recommend any contract for the working of the mines, or transport of the mineral, to be offered to him.

The iron mines are worked by the different traders, who give grain, tobacco, and salt, to the value of one rupee per maund of metal. Should the coal mines be worked eventually, it would be necessary to pay for the labour in like manner, for money is unknown to the lower orders; cowries alone are current, and there is a great scarcity of them even. Although there are but few inhabitants, many poor people from the surrounding states would flock to earn food, if proper protection be afforded them. Some difficulty would be experienced at the outset, but that would soon subside.

On the Tálcheer Coal.

That which I shall distinguish by the appellation of "Tálcheer Coal," is found near the town and gurh of that name; the town gives name to the whole district, which is 14 Ooreya coss in circumference, or forty-two English miles, more or less.

Tálcheergurh (the Rája's stockaded palace) and town (called Patna) are situated on the south bank of the river Brahmenee, on a sandstone rock, rising to the height of 20 or 30 feet from the level of the water. The surrounding country is undulating, with a thin stratum of soil resting on shingle, composed of the debris of primitive

rocks, iron clay, jasper, &c. Half a mile or less above the gurh, is a small nullá called, "Billaijoorce," about fifteen yards wide, with a sandy bed, and dry except in the rainy season after heavy falls in the interior, where it takes its rise, and winding considerably, joins ultimately with the Brahmenee at this place.

About 400 yards from the mouth of the nullá, coal seams are exposed to view for some distance along the banks, alternately, on either side; these seams vary in quality and thickness, and are curved parallel with the undulations of the superstrata. In almost every place where the coal seams cease abruptly, they will be found to rest against the sandstone.

The superstrata generally consist of alluvial soil, shingle, marl, blue clay passing into peat, mixing with shale and coal of inferior quality, beneath which the good coal is found; this again rests on indurated blue clay containing particles of coal, mica, and fossil plants. The stratum is about 1½ foot thick, beneath which a stiff grey clay mixed with sand and mica, is found.

I made a perpendicular cut in the north bank, at a spot where inferior specimens had been collected by workmen sent some years ago by Mr. G. Becher, executive officer of the division. Having dug down for two or three feet below the surface of the bed of the nullá, I met with a hard blue rock containing particles of coal and fossil plants, in this I bored a hole 1½ foot deep, and blasted it with one pound of country powder, which enabled me to ascertain the thickness, viz. 1½ foot, as before said.

The section thus afforded, gave

Shingle and clay, averaging, ...	10 ft.
Blue clay passing into peat, ...	1½ ft.
Shale, or slaty coal and lignite, ...	1½ ft.
Good glistening coal, ...	1 to 1½ ft.
Grey rock with fossils and coal, ...	1 ft.
Ditto ditto, with mica, ...	6 inches,
Stiff grey clay with mica and sand (?)	

Digging a few feet apart from this spot, in the bed of the nullá, the coal was three feet below the surface, without the peat and clay, &c. and under the opposite bank the coal is several feet deeper still.

I burnt a heap consisting of several maunds of the different kinds mixed together, the whole was consumed, leaving fine white ashes, but no cinder or coke. The glistening or good qualities emitted much gas, and burnt with a bright flame; the remainder soon attained a red heat with less gas—the whole gave out an intense heat.

The bed of coal thus examined is (as will have appeared) very thin,

but I should think that on mining, any quantity could be obtained, and at little cost, from its being so near the surface, and labor cheap in the extreme. It possesses, further, great advantages in being so near to a navigable river.

I shall treat hereafter on the method of working the mines, and of transporting the coal, &c. in a separate paper at the close of my report.

Coal fields of the Hingolai Tacooranee at Mungulpersád.

Of the two coal fields exposed to view, and which were visited by me, that which I have called the "Tacooranee" is the more extensive. It is laid bare by a broad nullá passing through it, called the "Sungurra," it comes from the hills in Ungool, in a south-westerly direction, and is about thirty yards wide, having a sandy bed. The coal appears on either side alternately, for a distance of upwards of a mile, the beds averaging from five to fifteen feet and more in height from the level of the sand. This coal (like that at Tálcheer) rests against the sandstone, and in some places passes into it, apparently mixing with it. The quality of the mineral varies very considerably, as will be seen by the numerous specimens presented to the Committee.

In one spot the coal has apparently been reduced to ash by volcanic action for a space of fifty yards, and upheaved above the common level of the contiguous beds; it is bounded at each extremity by dykes of white rock.

The superstrata vary in kind and thickness; in some places there is blue clay, above which is marl and shingle; in others, simply marl and iron ore, laterite, and shingle, and frequently but a thin stratum of clay. At the spot where the "Tacooranee" (goddess) called "Hingolai" is supposed to preside, the coal is entirely bare for a space of 1000 or 1200 yards (superficial) with an undulating surface. It is at this place that at the full of the moon of Chát-Byesk, the priesthood set fire to a heap of coal, which they keep burning for three successive days, commencing the day preceding the full of the moon, when hundreds of deluded creatures flock from the surrounding country to worship the goddess of destruction, who is supposed thus to shew her presence in the burning rock. I was unable to ascertain how far up the nullá the coal is exposed to view, as the inhabitants of one state will say nothing about their own country, and still less about that of another Rája; and as the Ungool territory is only half a mile distant, without any alteration in the general appearance of the country, which is undulating, I did not deem it necessary

to proceed further. There was sufficient coal at this place to afford an ample supply for the next century.

The cost here of working either the coal or iron mines would be the same as at Tálcheer, it would, however, be necessary to construct a road (perhaps a rail road) to the river side, a distance of sixteen or eighteen miles, but perhaps less in a direct line. The nullá is not navigable at any season, however from the tolerably level nature of the country it might be rendered so for two or three months, by constructing dams and locks at convenient distances. At all seasons water is found from one to three feet below the surface of the sand; this prevented my ascertaining the actual depth of the coal measures and the quality of the lower veins.

Note on the Iron Mines.

Iron ore is found in great abundance both in Tálcheer and in the adjacent states of Ungool and Dhenkennal. There are iron works in each, and the Cuttack and Berhampoor markets are supplied by them. Some of the iron is of a superior and malleable quantity, but much of it is very coarse-grained and brittle, the prices vary accordingly.

I saw the remains of several iron works on the road between Tálcheer and Mungulpersád, the "Lohorás," or iron workers, having forsaken them last year in consequence of the famine, and subsequent pestilence (cholera) which almost depopulated the country.

The process of smelting the ore is the same as that pursued in other parts of India, and which therefore it will be superfluous for me to describe.

Had I met with any iron workers I would have tried to smelt the ore with coal, as it is abundant on the surface at the coal mines, as I have before mentioned.

A great quantity of iron is made in the Sumbulpoor state also.

Art. IV.—*Objects of Research in Affghanistan. By* Professor Lassen, *of Bonn.*

[We have the pleasure to insert the following article by Professor Lassen, and which in order that no time should be lost in its circulation, we have already caused to be published in the Newspapers of this Presidency. Such communications as Professor Lassen's queries may elicit we shall be happy to publish without delay.—Eds.]

1. A country which has hitherto not been explored, is Kandahar and its neighbourhood; the capital of Demetrius, called by his name Demetrias, was situated in Arachosia, and it seems probable, that coins of Demetrius will be found most numerously in that part of Afghanistan, if Mr. Masson should have means for sending some qualified person there. Another class of coins might also be chiefly expected from Kandahar. Arachosia belonged, at least generally, to the empire of the Arsacidæ, who can only be supposed to have occasionally possessed parts of Kabul; Parthian coins bearing a Greek legend on one side and a Bactrian on the other, will probably have been struck only by such kings, as ruled in Kabul and its neighbourhood. Vonones (or by the native legend his son Vologases) is the only known Parthian king, from whom we have as yet coins of the above description; another name found on a coin published by Swinton is not legible; a new coin was lately edited by Mr. Millingan, having no Greek, only a Bactrian legend, evidently an Arsacidan one, though not legible. It would be of great importance to complete this Parthian series, because the chronology of the Arsacidæ might then be brought to bear on that of the Indo-Scythians.

2. From the country to the westward of Kabul and the sources of the Kabul river, which the Chinese call by the name of Kissin, coins of the first dynasty of Indo-Scythians may be expected chiefly, if the researches could be extended to the neighbourhood of the Lake Yarah. Segistan still bears the names of the first Indo-Scythians, who were properly called Sacæ, and their capital must have been somewhere in Drangiana. Also the Greek king Artimachus appears from one of his coins to have reigned near the Lake Yarah, and it would not be unreasonable to expect coins of him and his successors, (perhaps even Greek monuments of other kinds,) from those tracts, if made accessible.

3. The town Nagara, mentioned by Ptolemæus, with the Greek surname of Dionysopolis, must have been the capital of some Greek kingdom, probably of Agathocles and Pantaleon, who exhibit the symbols of Dionysos on their coins. The Chinese mention Nakoloho which is the same name, as the site of the flourishing Buddhist establishment, about 400 years of our era in the Chinese place

Nakoloho on the river Hilo, which must be the Hir found on D'Anville's maps. It would be of importance to determine the exact situation of Nagara, and to ascertain, whether the name both of the river and the ancient town are not still traceable. I suppose the Hir to be Surshud. The ruin of Nagara may be expected to yield a new harvest of Greek coins, and its neighbourhood might perhaps furnish us with Greek inscriptions.

4. Sultan Baber mentions a monument in Lawghan, which the Mahomedans supposed to be the grave of Lamech; the Chinese travellers passed through this country, called by them Larpho, on the road to Peshawer, from which it may be concluded, that they went to see some Buddhist monument there. Would it not be possible to get some further information of what remains still to be found in Lawghan?

5. Pliny mentions a town Copissa, 'destroyed by Cyrus,' in the country of the Paropomasidæ; by the accounts of the Chinese travellers Kapisa is the valley of the Gurbad river. Are no remains to be found along that river? and is the name at present quite unknown? It would be of some interest, because it might be conjectured that the name of Kapisa has some relation to the name of the king Kadphises, who on his coins spells his name in the native legend Kapissa.

6. The Chinese speak of a flourishing Buddhist kingdom Udjana, or Ujjana, which was situated on the western bank of the Indus and on the Sewad river, the capital was not far from the last mentioned one, and was called Mangala. As far as I know, this country has not been explored at all, and might be expected to yield coins of the dynasty ruling for several centuries there: topes might also be sought for in that neighbourhood.

7. Jan Messon, as well as Sultan Baber, speaks often of a river, which he calls Baran, without giving any more definite description of its course. Is this river different from the lower part of the Penjhir? or is it only the name for a part of that river?

8. A theory has lately been set forth respecting the topes, that they are to be regarded as dehgops, and contain relics of Buddhist saints; moreover, that the coins found in them have been placed there at different times as offerings, and consequently that the date of coins found in a tope, affords no clue to the period of its erection. Now, this theory supposes that the topes had entrances and openings, by which the coins might be inserted, and the relics taken out at certain festivals to be shown to the people, as is mentioned by the Chinese travellers of dehgops. Are there any traces of such entrances or openings in any of the topes of Kabulistan?

9. Is the dialect of the Kohistanis of Kabulistan a peculiar one, or related to the Lawghans, or that of the inhabitants of Kaferstan?

10. The Kirdhkis mentioned by Mr. Elphinstone as forming part of the population of Eastern Kabulistan, speak an Indian dialect; is this dialect nearly related to Punjab? and are the Kirdhkis to be regarded as emigrants from India in comparatively modern times, or remains of the ancient Hindu population? As far down as to the times of Mahmud of Ghazna it may be shown, that the inhabitants of Kabulistan were Indians, and most probably direct descendants of the Gurves, Ascadars and Gandars spoken of by the ancients.

ART. V.—*On the detection of Arsenical Poisons by* MARSH'S *process—its inapplicability to the Sulphurets of Arsenic—and the mode of obviating the fallacy occasioned by Antimonial Compounds. By* W. B. O'SHAUGHNESSY, M. D. *Acting Joint-Secretary to the Asiatic Society.*

In December, 1836, I exhibited to a large party at Government House the very beautiful process invented by Mr. MARSH of Woolwich, for the detection of minute quantities of arsenical poisons. The method consists in placing the suspected substance in very dilute sulphuric acid, and introducing a slip of pure zinc. The hydrogen is evolved in combination with the metallic arsenic, and on examination presents most distinct and remarkable phenomena. If ignited, the flame is of a leaden blue color, and diffuses a powerful odour of garlic, and a dense white smoke. If the flame be reduced to the size of a pea, and applied to the interior of a thin glass tube, a crust of metallic arsenic is formed on the tube, surrounded by a white ring of arsenious acid. To this, by a little dexterous management, the several tests for arsenic may be applied, namely the ammoniacal-nitrates of silver and copper, and the sulphuretted hydrogen gas.

A few months after the meeting referred to, I had occasion to apply the process to the examination of the contents of the stomach of the Munshi of the Coroner's Office, who had been poisoned by arsenic contained in a ball of sweetmeat. The results were quite conclusive, and were, moreover, checked by the performance of the common process on a portion of the large quantity of arsenic adherent to the mucous membrane of the stomach.

Up to the time of this occurrence, and indeed for some months later, I participated in MARSH's opinion, that this admirable process was applicable to all the arsenical poisons—to those not dissolved by water

as well as those soluble in that liquid; but on the occasion of a second death by one of these poisons, which came under investigation before the Police in 1838, I had proof that this opinion was erroneous.

The deceased was a young female, to whom a large quantity of crystallized yellow orpiment (sulphuret of arsenic) had been administered in curry, and in consequence of which she died after a few hours' illness. On examination of the body a quantity of yellow powder was readily separated from the contents of the stomach, and the mucous membrane of that organ was observed to be sprinkled all over with shining gold-like crystals.

On applying MARSH's process to a portion of the yellow matter, no indications whatever of arsenic were obtained.

A quantity of the powder was then dissolved in liquid ammonia, and MARSH's process applied, still with negative results.

I then tried the effect of converting the sulphuret into arsenious acid, which was done by boiling the yellow matter with a few drops of nitric acid. On diluting the solution with water, it was found that a single drop tested by MARSH's method gave a most distinct metallic crust, which was readily proved to be arsenic by the application of the silver, copper, and sulphuretted hydrogen gas.

These facts are of much practical importance, especially in this country, where orpiment is commonly used as a poison. They shew that in all cases where arsenic may have been employed, we must, in the event of MARSH's process proving negative, apply a modification of the experiment I have related, so as to bring the sulphuret of arsenic into the state of an oxide. For this purpose the insoluble parts of the contents of the stomach should be boiled in a capsule of glass or porcelain, with small quantities of nitric acid, until red fumes are no longer given off. The mass should then be diluted with water, neutralized with carbonate of potash or soda, and, lastly, examined by MARSH's method.

To shew the delicacy of this process, I may state, that I have applied it to the one-tenth part of a grain of orpiment mixed with four ounces of solid and fluid animal matter. By boiling with nitric acid, diluting with water and neutralizing, ten ounces of a liquid mixture were obtained, from half a fluid ounce of which the metal was reduced, although the quantity could not have been quite the 200th part of a grain.

I have next to notice the only serious fallacy to which this most ingenious method is liable, and which was first pointed out by Mr. Thomson in the *Philosophical Magazine* for May, 1837. It consists in the indications given by the soluble antimonial compounds, several of which are employed in medicine, one especially as an emetic in the treatment of cases of suspected poisoning.

By repeating MARSH's process on a mixture containing tartarized antimony, it will be seen that the gas evolved burns with nearly the same color, and deposits a similar crust on the glass tube.

On examining closely the distinguishing characters of this crust, it is very possible for an experienced eye to distinguish it from one produced by arsenic. The eye however must be experienced indeed, and that to a degree which very few observers can be supposed to lay claim to. Again, the sulphuretted hydrogen produces with crusts of arsenic and antimony yellow stains so faintly differing in tint as to lend even a practised experimentalist but little assistance in his research. The sulphate of copper, again, gives only such indications as are too faint to be relied on individually, though of some value as corroborating evidence.

Nevertheless the silver test can be readily applied so as to give unquestionable evidence of the nature of the crust of metal and of oxide obtained by MARSH's process. This may be accomplished by a method which differs slightly from one pointed out by Mr. Thomson in the paper alluded to. The tube on cooling should be moistened with a solution of nitrate of silver in distilled water, and then held over the mouth of a bottle containing strong ammonia, so that the vapor may traverse the tube. If the crust be arsenical, it instantaneously assumes a vivid canary color, owing to the formation of the arsenite of silver. No approach to such an effect is produced by the antimonial compounds, so that this test affords a simple, but most conclusive check on MARSH's invaluable method

It is right to repeat a precaution as to the zinc employed. That found in the bazar often contains traces of arsenic, and should always be tested itself by MARSH's process before being employed in pursuit of any legal investigation. Secondly, the zinc by which arsenic has been once detected should never be used again, as the surface often unites with and retains as much of that metal as may falsify a further experiment.

ART. VI.—*Proceedings of the Asiatic Society.*

Wednesday Evening, the 6th February, 1839.

The Honorable Sir E. RYAN, President, in the chair.

The Proceedings of the last Meeting were read and confirmed.

Messrs A. PORTEOUS and J. COWIE, proposed at the last Meeting, were ballotted for, and duly elected Members of the Society.

Mr. WM. JAMESON proposed by the President, seconded by Mr. H. T. PRINSEP.

The Honorable Sir H. SETON proposed by the President, seconded by the LORD BISHOP of Calcutta.

The Rev. JOHN HENRY PRATT, of Caius College, Cambridge, M. A. proposed by the President, seconded by the LORD BISHOP of Calcutta.

Mr. EDW. THOMAS proposed by Capt. FORBES, seconded by Dr. O'SHAUGHNESSY.

Mr. J. W. LAIDLY proposed by Mr. W. STORM, seconded by Dr. O'SHAUGHNESSY.

Mr. A. C. DUNLOP proposed by Mr. HARE, seconded by Dr. GOODEVE.

Read a letter from C. G. MANSELL, Esq. stating that in consequence of his proceeding to England for a sort time he was obliged to withdraw from the Society, which he hoped to rejoin on his return to India.

Read the following letter from Government sanctioning the purchase of 100 copies of the Latin and Anamitan part of the Cochin-Chinese Dictionary, prepared by the Right Rev. the BISHOP of Isauropolis, for 1000 rupees, in addition to the payments already made for the first part of the work in question.

'No. 16.

'To W. B. O'SHAUGHNESSY, Esq. M. D. *Officiating Secretary Asiatic Society.*

'*Genl. Dept.*

'SIR,—I am directed to acknowledge the receipt of your letter, dated the 22d ultimo, and in reply to state, that his Honor in Council has heretofore refused to incur the expense of 2000 rupees towards executing the revised Latin Anamitan Dictionary, nevertheless rather than the 100 copies subscribed for by Government should be mutilated, and imperfect, his Honor the President in Council consents to add 1000 rupees to the payments already made by Government, under the condition of obtaining 100 complete sets of the work, besides the separate vocabularies.

'I have the honor to be, Sir,

'Your most obedient servant,

'*Council Chamber, the 2d Jan.* 1839.' 'H. T. PRINSEP,

'*Secy. to the Govt. of India.*'

Library.

The following books were presented:

Transactions of the Society of Arts, &c. vol. 51, part 2nd—*by the Society.*

Rapport sur les Poissons Fossiles decouverts en Angleterre par L. Agassiz, Neuchatel, 1835—*by the Author.*

Actes de la Societe Helvetique des Sciences Naturelles—*by the Society.*

Map of the Eastern Frontier of British India, with the adjacent countries extending to Yunan in China, by Capt, R. B. PEMBERTON—*by the Government of India.*

The following books were received from the booksellers:

Georgii Wilhelmi Freytagii Lexicon Arabico-Latinum, Tome 4th.

Lardner's Cabinet Cyclopædia—Literary Men of France, vol. 1st.

Museum.

King and Queen of White Ants, presented by W. STORM, Esq.

Physical.

The Secretary read the following correspondence which took place with Government regarding Major Hay's collection of Natural History Specimens.

Copy of the letter addressed to Government, pursuant to the recommendation of the Committee of Papers.

To H. T. PRINSEP, Esq.

Secretary to the Government of India, General Department.

'SIR,

'I am directed by the Asiatic Society to request that you will submit to his Honor the President the accompanying copies, 1st, of a letter from Major Hay, relative to his Museum of objects of Natural History; 2d, of a report by a Special Committee of the Asiatic Society appointed to examine that collection.

'In submitting these documents to the notice of his Honor in Council, the Asiatic Society direct me to add a statement of their views on the several subjects referred to by Major Hay and the Sub-Committee.

'In the opinion of the Asiatic Society, the collection imported by Major Hay is of the highest value, in a scientific point of view. It not only affords to the naturalists of India standard specimens for reference in pursuit of their numerous researches, but it possesses the still greater value of being available for the introduction of the systematic study of Natural History among the Natives of Bengal, a study impracticable without the aid of such a collection, and indispensable as a preliminary measure to the full investigation of the Zoology and Natural History of our Indian possessions.

'The duplicates contained in Major Hay's collection would, moreover, serve the two-fold end of completing the Museum of the Court of Directors in London, and of procuring for India exchanges of valuable objects neither comprised in Major Hay's collection, nor indigenous in this country.

'The Society while thus fully aware of the valuable opportunity now afforded for the promotion of the study of Natural History in India, are not insensible to the difficulties which oppose themselves to the procural of Major Hay's Museum. The estimate of its pecuniary value, submitted by the proprietor, far exceeds the resources of the Society, or any subscriptions which might be collected among individuals anxious to promote the object in view.

'It seems possible still that were the Government to extend its patronage and pecuniary aid to the Museum, that the current efforts of the Society and of individual subscribers might lead to the accomplishment of some arrangement which would secure the acquisition of this Museum for Bengal.

'In the event of such measures being adopted, the Society will gladly apply their establishment to the custody of the Museum, and they pledge themselves at all times to facilitate the application thereof to the furtherance of the chief end of its acquisition, namely, the instruction of the Natives of Bengal in the several subjects, such collections are capable of illustrating. For this purpose the Museum might be held available for the illustration of lectures in Natural History, delivered at any Government Institution in Calcutta, such precautions being taken as would secure it from injury or loss.

'I am directed finally to refer to your letter of the 26th July, 1838, in which you state "that the Governor General of India in Council will be ready to receive from the Society recommendations for the purchase or other procurement of objects of more than common interest, of which the Society may receive information, and for the obtainment of which it may want the necessary funds."

'The Society most respectfully represent the present occasion as one eminently deserving of the patronage of the Government, in the spirit of the views expressed in the preceding extract.'

I have, &c.

'*7th Jan.* 1838.'

W. B. O'SHAUGHNESSY.

'*To the Secretary of the Asiatic Society, &c. &c. Calcutta.*

'SIR, *Agra, December 2nd*, 1838.

'I beg to forward for the consideration of the President and members of the Asiatic Society some papers connected with a collection of natural curiosities lately accumulated by myself on a visit to the Cape of Good Hope, and Islands in the Eastern Archipelago.

'In the first instance, I will briefly state my views in forming it; and afterwards proceed, as far as I am able, to give details. Until the publication of Swainson's volumes on the Classification of Animals, and afterwards of the Quadrupeds and Birds, I never prosecuted the science with that ardour which these books enticed me to. His distinctions, however, appearing so beautifully clear, it occurred to me that a Museum classified from these books, upon one uniform principle, could not fail to prove interesting; and that such was much wanting in Calcutta, I had not a doubt. I was then at the Cape of Good Hope for the benefit of my health, and having much leisure time, I took the thing in hand. My first care was to get the specimens in the vicinity of the Cape, selecting chiefly those in illustration of *genera*. I then became acquainted with that unexceptionable, *practical* naturalist and taxidermist, Monsieur Verreaux, who had been extolled for his art by his master Cuvier; had been the personal friend of Levaillant; the intimate associate of Ruppell and Lesson; and well known to several other naturalists of note. In such a person how could I fail to be interested? Through this individual I procured the only duplicate skins existing of the large collection formed by that zealous naturalist, Dr. A. Smith, who had just returned from the scientific expedition into the interior of Africa, and whose work of African Zoology is only now in course of publication. My original purchase was limited to one hundred pounds, adding for this sum only twenty genera, and a few new species. Finding however my little stock, by the addition of new discoveries, increase in interest, I determined to endeavour to procure from South America those gorgeous specimens for which that country is so celebrated, to add to the beauty of the whole. With this view I made a list of the most interesting genera, and wrote to Rio Janeiro, where I knew Dr. Natterer, the German naturalist, had been collecting for the Emperor of Austria. From that country I procured many rare and interesting birds, and a vast collection of insects. Monsieur Verreaux hearing of the illness of his father in Paris, determined upon a hasty return to his own country, and wishing to go immediately, unincumbered, offered me the whole of his remaining specimens then at the Cape, mounted and in skin. I had now become the purchaser of animals, birds, &c. to the amount of fifteen hundred pounds. The remainder of my purchases at the Cape from different naturalists being about five hundred more. I shortly determined upon leaving the Cape and proceeding to Java, with the intention of returning to India viâ the Eastern Archipelago, for the purpose of adding largly to (what I shall now denominate) the *Museum*. On this tour I was obliged to content myself with skins, obtaining large numbers, and curing them myself. From the Buggeese I was fortunate enough to procure some rare and interesting specimens from the Moluccas and Borneo: in fact I left no part of the Eastern Archipelago untouched, and have now brought to Calcutta the whole of my labours.

'Here, however, my difficulties commence. Upon my arrival I find my circumstances changed, and that independent of the whole of my private means expended in the forming this Museum, when my accounts are closed, I shall have a balance against me of about twenty thousand rupees, to meet which I supposed I had resources, but sundry misfortunes have left me none.

'My return to Calcutta had been so arranged that I should have had three months remaining of unexpired leave to devote to the arrangement of all I had gathered together; instead of which I found myself hampered by the most unforeseen difficulties, with no immediate funds to defray the expenses. Obliged to hurry to the Upper Pro-

vinces to join my regiment, forming a portion of the army of the Indus, it now became a serious consideration what was to become of all I had with so much labour and anxiety amassed together.

'With only ten days to remain in Calcutta, honor pointed out to me but one course, which was to expose the whole for inspection, and eventual sale in satisfaction of my creditors. This I have done, and the greater portion is now to be seen at the rooms of Moore, Hickey, and Co. Up to the time of my leaving, I had however found it impossible to unpack, and expose for view in a secure place, the valuable portion of skins; but, although I have no list of the whole, I beg to forward a list of those now exposed for sale, the remainder are in various boxes in the godowns of Moore, Hickey, and Co. and at my own agent's, John Lowe and Co.

'My great desire is, that if this Museum is sold, it should be disposed of to some Public Society, or to any number of persons who would allow it to remain as a Museum for public reference.

'I have estimated the expense of the whole at thirty thousand rupees: but my sole wish is to realise a suffice to pay my debt, and with this view I offer it to the Asiatic Society.

'My original intention was to have exhibited it, and have demanded one rupee for the entrance of each person to defray its expenses, after which I should have handed it over to one of the Public Societies gratis.

'From the published proceedings of your Society, I glean that you are not in the habit of expending large sums of money on specimens, but nevertheless you might probably do me the honor at an early meeting of your Society to bring the matter forward; and a discussion on your part might bring it to the notice of Government, or it might assist me in disposing of what may be on my return from Cabul a mere wreck, from want of a little care.

'I beg also to notice, that just one year ago I despatched from Cape Town into the Namaqua country an intelligent man, furnished with a waggon and oxen, and every necessary for the purpose of collecting. Up to the latest accounts he had not returned. The expense incurred in fitting out the expedition amounted to nearly four hundred pounds, and upon his return I am entitled, without paying any thing more, to the half of every thing, which I will add free of expense to any Society or parties who may purchase the whole Museum; and as the man deputed was formerly with Captain Alexander on his travels, and at the same time an experienced person in preparing skins, &c. it is probable that he will return with many of great interest and value.

'I shall now proceed to forward catalogues of the specimens in Calcutta, forming the Museum.

'I have the honor to be, Sir,

'Your most obedient servant,

'WILLIAM E. HAY.'

'P.S. I have succeeded in getting lists of the mounted specimens printed, but not of the skins, which must be forwarded hereafter. I have added one sheet of the skins, but time will not admit of more.'

Report of a Special Committee of the Asiatic Society on the Zoological Collection recently introduced to India by Major W. E. Hay.

'In estimating the value of this collection, your Committee beg to state that they must be guided by different considerations from those by which they would be influenced were the objects comprising it indigenous to India.

'The collection has been made in Africa, South America, and the Straits composing the Molucca islands; many of the objects it contains are the result of Dr. A. Smith's mission to the interior of South Africa, other parts of it were collected under the direction of M. Verreaux, and the rest by Major Hay himself, aided by M. Verreaux in

determining most of the species; so that the collection comprises many of the most remarkable forms from quarters of the world from which the Society have hitherto received no contributions, and with which persons residing in India could only become acquainted through the medium of books.

'The value of a collection that places it in our power here, to become acquainted with several hundred animals which otherwise we should only know by their published descriptions, must obviously be great; for so long as this country remains without such collections in every department of Natural History, so long must we be deficient in one of the first requisites for advancement in the higher branches of natural science.

'Major Hay's collection has yet another peculiar recommendation to us in this country, which elsewhere, perhaps, would be of less importance; namely, that most of its contents have been identified by Dr. Smith and M. Verreaux, so that the species it contains would be so many land-marks to which we could safely refer in the classification of the animals of this country—an object which still in a great measure remains to be accomplished.

'Such being our views of the importance of Major Hay's Zoological Collection, we are of opinion that the pecuniary estimate of its value, referred to in Major Hay's letter to the Society, is not over-rated; but we regret that in the present condition of the Society in regard to disposable funds, we cannot recommend so great an outlay.

'As, however, the safety of this valuable collection is an object worthy of our solicitude, we beg to recommend that the rooms of the Society be offered for its reception, that it might be at once safely and economically exhibited on the part of Major Hay, or those into whose hands it may have fallen.

'Were such an offer to be accepted, instead of being exposed to injury in a public sale room, without the necessary attention from persons accustomed to such a charge, the collection might be much augmented in value by the exchange of duplicates with the Society. In recommending this course, we are guided equally by all interests concerned, for while we form the very highest estimate of the value of the collection, in a scientific point of view, we cannot but regret to think that if it were put up for sale, it would barely realise the expenses which have been perhaps already incurred by its exhibition.

'D. M'LEOD,
'W. CRACROFT,
'J. M'CLELLAND,
'GEO. EVANS.'

No. 72.

The Officiating Secretary to the Asiatic Society.

'*Genl. Dept.*

'SIR,—I am directed to acknowledge the receipt of your letter dated the 7th instant, forwarding copies of a letter from Major Hay, relative to his Museum of objects of Natural History, and of a report by a Special Committee of the Asiatic Society, appointed to examine that collection.

'2nd. In reply, I am directed to state, that the President in Council cannot regard a collection of prepared Birds, and other animals, as falling within the class of objects which the Government of India expressed its readiness to receive from the Society recommendations to purchase, or otherwise procure. Such preparations have always appeared to Government to be too perishable to be made objects of collection in a climate like that of Bengal, and fall within the exception referred to in the last paragraph of my letter, dated the 26th July, 1837. His Honor in Council cannot therefore entertain the proposition that the Government should purchase Major Hay's extensive collection of objects of Natural History, but would suggest that the specimens are better adapted for the Museums of Europe, where the climate is less destructive.

'I am, Sir, your obedient servant,

'H. T. PRINSEP,

'*Council Chamber, the 6th Jan.* 1839.' '*Secy. to the Govt. of India.*'

Read a letter from Dr. LORD, dated Peshawar, 4th November 1838, forwarding two boxes of specimens of Natural History, collected by him while he was attached to Capt. BURNES's mission.

Read a letter from J. G. MALCOLMSON, Esq. regarding M. AGASSIZ' opinions on the erratic blocks of the Jura, &c. &c.

Read a letter from Mr. PRICHARD to Mr. J. W. GRANT, on the microscopic examination of lignite from Sandway.

Notes on the dissection of the Arctonix Collaris, by Dr. GEO. EVANS.

A paper on Artificial Hatching in Egypt, by M. DEMAS.

Notes on a new genus of the *Fissirostres, Todidæ*, Vigors, by Mr. B. H. HODGSON.

On the conclusion of the business, the Officiating Secretary read the following report from Col. D. M'LEOD, Chief Engineer, on the best and most economical mode of extending the accommodation of the Society's House, with the view of having carried into effect any additions and improvements that may be determined on, simultaneously with the general repairs of the building, now become absolutely necessary for its preservation.

Col. D. M'LEOD, also forwarded two plans, No. 1 and 2, with his report, and an estimate from Messrs. SHERRIFF and Co., the builders, amounting to rupees 10,664-15.

'*To the Officiating Secretary to the Asiatic Society.*

'SIR,—In compliance with the desire expressed at the last meeting of the Society, that I would examine and report on the best and most economical means of extending the accommodation of the Society's House, with the view of having carried into effect any additions and improvements that may be determined on, simultaneously with the general repairs of the building, now become absolutely necessary for its preservation, I beg leave to state to you, for communication to the next meeting of our Society, that I have repeatedly, and carefully examined the building in communication with Mr. ROWE, the builder, and with reference to the extent of additional accommodation which I am led to understand will soon be found desirable, if not indispensable, for the Society's rapidly increasing collections in all departments. I have the honor to report my opinion as follows:

'2nd. In addition to the ordinary repairs of cleaning up the interior and exterior of the building, and painting, it has been ascertained that the decayed state of the staircase roof is such as to demand its immediate removal, and renewal; and it is, I believe, generally agreed that a skylight in that apartment, or in the passage between it and the Hall is indispensable, as the effect of the valuable collection of pictures placed there is quite lost, from the absence of a proper or sufficient light. The roof of the staircase, however, being about three feet higher than that of the passage, the light from the former would in a great measure be intercepted by the architrave over the colonnade, and would consequently be so far defective. I would therefore recommend its being placed on the roof of the passage, in its centre, on a design (a drawing of which accompanies) now of general adoption in the Department of Public Works, and which I have always found to answer the purpose extremely well, and to continue water proof. The cost of such a skylight, measuring eight feet by six feet, as appears by Mr. ROWE's estimate, will only amount to Rs. 150.

'3rd. It was also I believe admitted, that a small staircase leading to the roof, such as is appended to almost every dwelling house here, is much needed, in lieu of the very inconvenient ladder, with trap door, now existing for that purpose; this deficiency I propose to supply in connection with the extension of the building, which I have now to suggest.

'4th. Two different modes of effecting this object have occurred to me, in both of which, however, is included the erection of a large room, in two floors of thirty-six feet by twenty-four feet, on either side of the staircase room to the east and west.

'5th. The first, as represented in both floors of plan No. 1, would leave the present

staircase (which is in substantial condition) precisely as it now stands, and the proposed new side rooms free and entire, with the exception of having the northern part of one side cut off for the purpose of adding a small back stairs, and a retiring closet attached thereto. The cost of this arrangement, including the sky light, exclusive of the removal of the decayed roof, and of other repairs, is shewn in Mr. ROWE's estimate No. 1, to be rupees 8485-10, and if interior new doors are not judged requisite to the new rooms in the upper floor, this estimate will be reduced to rupees 7861-10, as there exist old ones which may be applied to the lower floor.

'6th. The second, as represented in plan No. 2, would remove entirely the present double staircase, and introduce it as a handsome single one into the curtailed new side room. The very thick walls now existing in the basement on each side of the flight of stairs, as well as the colonnades over them, would in this case become quite unnecessary, and ought to be removed, so as to leave the whole of that apartment from wall to wall, in the line of east and west, free, and uninterrupted both above and below. The extra accommodation thus to be obtained, would be about equal with that of the first proposal, and the effect produced on the general appearance of the rooms, on entering from the new staircase, would certainly be more grand and imposing; but on proceeding to arrange all matters necessarily involved in carrying this measure into effect, I find, that as shewn in Mr. ROWE's estimate No. 2, it is unavoidably more expensive than the first by rupees 3178-3-6, and as the advantage is only in appearance, I fear it must, as matter of course, be rejected in favor of plan No. 1.

'7th. Should the latter also be found too expensive to be met by the available funds of the Society, the only alteration I have at present to propose, is to reduce the size of the new side rooms, so as that the walls shall be in a line with the other walls of the house—leaving them I believe about 26 × 18 feet, which would of course diminish the charge considerably. But the Plan No. 1, if practicable, I would recommend, as it would be the means, I think, of preventing all future patching of the building—it provides at once two rooms of 36 × 24 feet and two rooms of 26 × 24 feet, with a suitable back stairs and closet in two floors, while it cannot be said to affect injuriously the light or the ventilation of the present apartments.

'8th. I would further beg leave to bring to the notice of the Meeting, that the dampness of the lower, or basement, floor is greatly complained of as a serious evil. I observe that this defect cannot conveniently be remedied by raising and new fluing, besides which that process would be attended with a heavy expenditure I would therefore recommend that an expedient now successfully adopted, of laying the floor in a composition of tar and sand, (a specimen of which may be seen in the Society's House, executed I understand about two years ago by Mr. Rowe,) be resorted to in the lower apartments, to correct this evil. Its cost, as shewn, in Mr. ROWE's estimate No. 3 will be Rs. 1007.

'9th. It only remains to show in abstract the total expense in which the Society will be involved by the adoption of plan No. 1, for extending the accommodation, in addition to the requisite general repairs. The following is the abstract:

For the ordinary repairs, as per Mr. ROWE's estimate, ..	Rs.	854	8	0
For the new Roof to the Staircase, ...	"	771	13	0
For new laying the floor of the Basement, ...	"	1007	0	0
For the proposed Skylight, ...	"	150	0	0
For the proposed 4 additional Rooms and all connected with them, ...	"	7861	10	0
Grand Total of Expenditure,	"	10,644	15	0

'10th In conclusion, I have to observe in reference to Mr. ROWE's estimates, that the rates are very fair and moderate throughout.

'I have the honor to be, Sir,

'Your most obedient servant

'*Fort William, February* 6, 1839.' 'D. M'LEOD.'

No. 2.

'Estimate for building two additional Rooms, Back Stairs, and Closet; also removing the Staircase, &c. and fixing a new Staircase in the Western Room, as per Plan No. 2.

Building two Rooms, &c. as particularized in Estimate No. 1.					8485 10 0
Alterations in the Staircase Room, 1 wall, $53\frac{1}{2} \times 3 \times 18\frac{1}{2}$	2969¼				
One Architrave, $53\frac{1}{2} \times 2 \times 3$	321				
Fixing Beams, $103\frac{1}{2} \times 1\frac{1}{2} \times 1\frac{1}{2}$	232¼				
Ditto ditto 2nd Story, $103\frac{1}{2} \times 1\frac{1}{2} \times 2\frac{1}{2}$ ..	388				
Roof and Floor, $53\frac{1}{2} \times 23 \times 2$	2461				
	6372	@	13/8	860 3 6	
Balustrade, $53\frac{1}{2} \times 1\frac{1}{2} \times 3\frac{1}{4}$	300¾		13/8	40 8 0	
8 Pillars, each 20 feet, ...			2/	320 0 0	
Inside Cornice, 153 feet, ...			/8	76 8 0	
Outside ditto, 54 ditto, ...			1/	54 0 0	
WOOD WORK.					
34 Beams, each 28 feet, 14 × 8 @ 1/8 ..				1428 0 0	
60 feet Architrave,.... 18 × 10 @ 1/ ..				120 0 0	
2500 feet Rafter..... 3 × 2 @ /6 ..				150 0 0	
Principal Staircase, including landing to be fixed in the New Western Room, ..				900 0 0	3949 3 6
				Co's. Rs.	12,434 13 6
Deduct the renewal of the decayed Roof, ..					771 0 4
					11,661 13 6

N. B. The above includes changing the old roof of Staircase Room.

Resolved,—That the Society approve of Col. M'Leod's Plan No. 1, and sanction the sum estimated for the construction of four additional rooms, and repairs of the premises, and that the Secretary be requested to communicate the resolution of the meeting to the Builders, with orders to commence the work, with as little delay as possible.

Meteorological Register, kept at the Assay Office, for the Month of February, 1839.

Day of the Month.	Forenoon, 10 A. M.													Afternoon, 4 P. M.											
	Atmospheric Pressure.		Temperature.			Hygrometry.			Aqueous tension.			Weather.			Atmospheric Pressure.		Temperature.		Hygrometry.			Aqueous tension.		Weather.		
	Old Stand Barometer.	Height at 32 Fah.	River water.	Well water	Air.	Depression.	Differential thermometer.	Hair Hygrometer.	By Dewpoint.	By Wetbulb.	By Hair Hygrometer.	Wind. Direction.	Wind. Force.	Aspect of Sky.	Old Stand Barometer.	Height at 32 Fah.	Air.	Dew point.	Depression.	Differential thermometer.	Hair Hygrometer.	By Dewpoint	By Wet bulb	By Hair Hygrometer.	Wind. Direction.	Wind. Force.	Aspect of Sky.
1	30,040	,037	71,7	74,8	74,3	5,7	6,0	92		71	82	n. w.	1	hazy.cir.str.	,920	,901	77,9		8,5	9,0	87		61	72	s. o.	1	cldy. haze.
2	,060	,065	72,3	75,0	75,0	7,7	7,0	91		62	80	n. o.	2½	do.	,942	,929	75,7		4 5	4,6	95		77	89	o.	0	do.
3	,050	,045	72,0	74,7	74,0	7,0		90		65	78	n. o.	0½	do.	,931	,908	78,0		9,0	10,0	82		60	63	s. o.	0½	haze
4	,032	,019	72,6	75,7	73,8	6,1	5,8	91		70	80	n. w.	0½	do.	,895	,867	79,7		11,6	11,5	79		50	57	S. w.	1	cldy. haze.
5	,988	,986			74,9	3,4	3,7	98		82	95	S. o.	1½	cir.str.haze	,885	,853	80,3		9,4	9,6	85		59	68	S. e.	2½	do.
6	,982	,968	73,4	76,2	76,7	5,4	6,0	92		74	82	S. w.	4	cldy. drizzle.	,914	,899	77,2		6,2	5,9	90		70	78	N. e.	1½	do. drizzle.
7	,020	,001	73,2	76,0	75,2	5,2		94		75	86	o.	0	clearng.	,942	,927	75,9		6,6	6,3	89		69	76	n. o.	0½	cir. cum. & st.
8		,977	73,2	75,9	75,0	6,7		90		67	78	s. o.	1	dull.	,920	,905	75,5		10,9	11,2	78		50	56	S. o.	2	cldy.cir.cum.
9	,948	,948			72,5	9,4	9,1	80		52	59			overct.fine	,827	,806	77,3		12,6	12,0	74		44	49	N. w.	2½	clear.
10																											
11	,908	,892	76,4	76,0	75,7	4,6	5,1	94		77	87	S. E.	4½	cldy.cir.str.	,785	,755	81,5		8,2	8,8	89		65	76	S. E.	3½	cir. cum.
12																											
13																											
14	,844	,843			78,9	5,5	5,9	94		75	87	S. o.	3	cldy.cir.str.	,725	,694	84,4		9,1	9,7	89		62	76	S. e.	3	Fine.
15	,786	,773	77,4	76,7	79,3	5,1	5,7	95		76	89	S. e.	5	cir.cm.bz.fr.	,663	,630	84,9		7,8	8,8	89		67	76	S. E.	5½	cir. cum.
16	,752	,733	77,4	76,2	78,9	9,1	9,2	82		60	63	N.	1½	clear.	,634	,637	85,5		15,7	15,7	72		39	46	S. e.	2½	Fine.
17	,860	,832	77,0	75,7	78,0	9,0	10,0	82		60	63	N	1½	do.	,750	,730	85,2		16,7	16,5	70		35	44	n. o.	1	do.
18	,914	,894	75,7	75,4	76,8	11,5	12,1	74		47	49	N. w.	1½	do.	,810	,775	83,7		20,4	19,2	59		22	30	n. w.	1½	do.
19	,954	,938	76,3	76,2	74,0	3,6	4,2	96		82	91	n. E.	1½	do.	,858	,822	83,9		18,4	17,0	64		29	36	n. w.	1½	clear.
20	,002	,972	76,1	75,3	78,0	13,7	13,4	72		40	46	s. E.	1½	do.	,886	,867	87,4		8,6	18,6	67		65	40	s. e.	0½	do.
21	,045	,012	77,5	76,2	79,4	9,7	10,1	83		57	65	o. e.	1	do.	,933	,915	87,3		16,6	17,0	72		37	46	S. e.	1½	do.
22	,014	,975	78,6	77,5	81,7	8,4	9,3	85		64	68	S. w.	1½	do.	,894	,882	88,0		12,4	13,6	80		52	59	s. e.	1½	do.
23	,986	,953	78,8	78,0	82,7	9,4	9,1	85		60	68	s. e.	1	do.	,868	,848	93,1		14,4	11,7	78		50	56	s. o.	0½	do.
24	,970	,843	79,0	78,1	82,9	9,9	10,0	83		59	65	s. o.	1	do.	,850	,827	93,0		17,0	16,0	69		40	42	s. w.	0½	do.
25	,954	,913			84,7	12,2	11,3	78		50	56	s. e	1	do.	,815	,798	92,8		17,9	18,0	71		37	45	s. w.	0½	do.
26	,894	,862	78,3	77,0	85,4	16,3	17,3	72		36	46	n w.	2	cir.cum.	,784		93,1		21,4	22,7	64		27	36	S. e.	2	cir. cum.
27	,872	,837	78,6	77,3	84,7	13,8	14,1	77		45	54	n. w.	2	clear.plst.	,776	,756	92,4		18,1	15,1	69		36	42	n. o.	1½	clear.
28																											
29																											
30																											
31														Between cl.& cldy.at intervals, showery indications												Between cl.& cldy.at inter. vals, showery indications.
Mean,	29,952	29,929	75,7	76,2	78,0	8,2	8,7	86		62	71	Sand N.	1½		29,842	29,843	83,6		12,5	12,8	77		50	56	Sand. N.	1½	

JOURNAL

OF

THE ASIATIC SOCIETY.

No. 87.—MARCH, 1839.

ART. I.—*Notice of an Inscription on a Slab discovered in February, 1838, by Capt.* T. S. BURT, *Bengal Engineers, in Bundelkhund, near Chhatarpur.—By the Editors.*

Captain BURT will have imputed, to the right causes, (Mr. PRINSEP's illness, and absence) the delay, with which we notice the impression of the above inscription, so obligingly forwarded by him. This communication, has added to the obligations which antiquarian science owes to him. The legend of the inscription is now presented to our readers with a translation—a relevant extract from Captain BURT's Journal*—some explanatory notes,—and a prosodial key to the inscribed verses, or rather Poem. A facsimile of the inscription is not added, because the character resembles the specimen published in our number for April, 1837 ; and Captain BURT describes it as No. 3, *Allahabad* pillar.

This slab, it will be seen, was found detached at one of several temples at *Khajrao*, nine coss from *Chhatarpur*, which is on the high road connecting *Saugar* and *Hamirpur*. *Khajrao* is described by Captain BURT as near *Rajgarhy*, which we assume to be the *Rajgarh* of the maps—a fortified town on the right bank of the *Cane* river S. E. from *Chhatarpur*. The place abounds with remains of temples, statuary, and monuments of ancient times. The slab was found in the temple dedicated to "LALAJEE." This name, (unknown to the Sanscrit theogonies) is probably the appellation locally current of some divinity whose *alias* we cannot conjecture. It may however be assumed, that

* Captain BURT's letter covering the inscription has been mislaid. We hope we have not taken a liberty in making an extract from a Journal of his Travels, in the hands of Thacker & Co., for the press.—EDS.

the slab does not belong to this edifice; and that that, celebrated in the polished verses now presented, has yielded to the mouldering hand of time. We may also assume, that its site, was the consecrated spot, described by Captain BURT, and that it gives us the genealogy of Rajas who formerly ruled in that part of the country.

We learn that Raja BANGA erected a lofty temple for the reception of an emerald emblem of SIVA, and a stone image of the god. On the death of this Raja, seemingly by voluntary immersion in the confluence of the *Yamuna* and *Ganga*, his territory was administered by the priest YASONHARA,—perhaps, during the minority of his heir JAYA VARMA DEVA. The original inscription, of sixty stanzas, was engraved and put up in 1019 *Sambat*, or 962 A. D.—that is about 877 years ago. From the two last, or supplementary, stanzas we learn, that it was engraved by order of Raja JAYA VARMA DEVA in "irregular" letters. He afterwards had it re-engraved in clear character: then because effaced, he again, at the distance of fifty-four years, had the poem re-engraved in the *Kakuda* character on the slab, from which Captain BURT has taken a faithful impression. It bears the date Friday, *Vaisakh* 3d, *Sudi Sambat* 1173, A. D. 1016. The poet was SRI RAM, who has not failed to give his own genealogy, and the caligraphist was "that GAUD'A' KAYASTHA."

The pious BANGA appears to have been of the Lunar race. The pedigree given by the slab is this

NANNUKA
|
VAG-YATI
|
VIJAYA
|
VIHALA
|
SRIHARSA, + KUNKATI his wife of the Gangetic race.
|
YASO-DHARMA DEVA + NARMA DEVA his wife.
|
BANGA.

BANGA appears to have been succeeded by JAYA VARMA DEVA, who may have been his son.

In the 12th vol. of the Asiatic Researches there is copy of an imperfect inscription taken from a slab translated by Capt. PRICE, who found it near *Mow*, a town ten miles from *Chhatarpur*. A place of that

name, in a North Westerly direction, appears on the map near the left bank of the Dassaun river. The name of JAYA VARMA DEVA is in the royal genealogy recorded on this slab; of which the date is effaced. This genealogy has also its VIJAYA; but it cannot be identified with that of BANGA. It appears however that when ANANTA, the Brahmin minister of his father and grandfather, drowned himself in the *Yamuna*, some other (probably a Brahmin) was appointed to the administration by JAYA VARMA,—because, as Capt. PRICE infers from words used in the inscription, he had abandoned worldly concerns.

In the *Khajrao* slab it is not stated that JAYA VARMA DEVA was the son of BANGA, but we learn that the priest YASONDHARA administered after the pious suicide of BANGA.* These circumstances afford some grounds, though weak, to identity the JAYA VARMA DEVA of both slabs. In case of identity, we may suppose that the two genealogies exhibit distinct branches of one family, and that JAYA VARMA DEVA succeeded collaterally. No doubt local inquiry would fling light on the history of the Kings or Chieftains here recorded.

The poet elevates BANGA into a great monarch and conqueror. Kings of *Oude* and even *Ceylon* attend to do him homage, and his captives are the wives of the kings of *Andra*, *Rad'ha*, and *Anga*. All this of course is the exaggeration and fancy of the poet. But the 19th stanza seems however to indicate the actual conquest by VIJAYA of southern territory.

BANGA's piety was not limited to the erection of the shrine. He also built mansions for seven Brahmins who officiated at the temple, which he endowed with lands. "Two *yavas* at *Sri Brahma kalpa*; one in the vicinity. *Kalpa gram*, on the south of the snowy mountains, was another." This obscure *sloka* introduces a new land measure. The *yava*, or barley corn, is the lowest linear measure,—and suits, neither royal munificence, nor priestly expectation. We have *Kalpi* on the right bank of the *Yamuna*; but unless to fill up the verse it would hardly be described as south of the snowy mountains. Is any *Sri Brahma kalpa* known in the vicinity?

We should be much gratified if this, and other points connected with this inscription receive the attention of Captain BURT, or any other intelligent correspondent who may have the opportunity of local inquiry. We will not dismiss the temple, without noticing XIÇÇHA "the carpenter," the Christopher Wren who built the "cloud-capt" fabric. No Indian name approaching to this is now known. Was he foreigner?

* In the 9th verse of the *Mow* slab the name of JAYA VARMA's father is incomplete. But BANGA would not suit the metre, and would make an incongruous compound.

Of the character of the Poem a few words remain to be said. It is composed in an ambitious style by an accomplished scholar. His verses are polished and elaborate; some however are obscure, and the quaint pedantry of *Sanscrit* Poetry here abounds. But in spite of these defects, many of the verses may be justly commended as containing much of truly poetical imagery, conveyed in lofty and polished diction. But we must leave space for Captain BURT's narrative.

Extract from the Journal.

I reached Chatterpore at 9 o'clock at night, (which was an earlier hour than I had stipulated for by twelve or thirteen hours), but my reason for pushing on was in order to have time to pay a visit to Khajrao, a place situated about nine pukka (full) koss (eighteen English miles) from Chatterpore, to the right of my road, and lying not far from Rajpore, or Ragurhy, or I think it is more correctly called Rajnuggur. The natives at a distance sometimes call Chatterpore Chatpore. It was whilst I was on my return trip from Eraw to Saugor that I heard, from a palky bearer, of the wonders of this place—Khajrao, near Chatpore, as he called it; and which he stated to be situated from Saugor seven *munzils*, or daily stages, for native pedestrians, which, at fifteen miles per day, is about the thing, Chatterpore being distant from Herrapore fifty miles, or one hundred from Saugor. I may as well now employ my twelve or thirteen hours spare time in taking a look at Khajrao along with the reader.

Immediately on my arrival at Chatterpore, at 9 o'clock at night, I told the *dawk moonshee*, (baboo, or writer) to procure a double set of sixteen bearers, and two spare men for a *bangie*, containing my food and printing materials, to start as soon as possible for Khajrao. I wished to arrive there before sunrise in the morning, and it lay at a distance of eighteen or twenty miles thence by an indifferent road. I left a pair of trunks and a pair of patarahs (tin boxes) under the care of the baboo, as I should not require them until my return, and in about an hour started for Khajrao, viâ Rajnuggur, and reached the temples of the former at seven or eight o'clock in the morning. The ruins which I went to see lie at some distance from the village, which lies beyond them, and this place I did not see, as a quantity of jungle intercepts the view of it. I was much delighted at the venerable, and picturesque appearance these several old temples presented, as I got within view of them. They reared their sun-burnt tops above the huge trees by which they are surrounded, with all the pride of supe-

rior height and age. But the chances are, the trees (or jungle rather) will eventually have the best of it. My first inquiry, after taking breakfast, was for ancient inscriptions, and a temple close by was immediately pointed out as the possessor of one. I went there, and sure enough there was an inscription in the No. 3 Sanscrit character of the Allahabad pillar, in the most perfect and beautiful state of preservation, engraved on a stone slab which measured about five feet by four, and was completely covered on the upper side with writing; the stone was laying at a slope against a step in the side wall of the temple. It was the largest, the finest, and the most legible inscription of any I had yet met with, and it was with absolute delight that I set to work to transfer its contents to paper. I took two copies, one on a plain white paper, without ink, by pressing it in a wet state with towels into the hollows formed by the letters, and another reversed with ink, which I spread upon the stone. The facsimile, or impression, obtained was the most beautiful specimen I have by me, and I regretted that the surface of the stone twenty square feet, was too large for me to spare time to make a duplicate with ink. The date of it is 1123,* Sunbat, or 771 years ago, as was distinctly pointed out in the lowermost line of the inscription; having done this I took a look around,—"Si monumentum quæris, circumspice,"—and could not help expressing a feeling of wonder at these splendid monuments of antiquity having been erected by a people who have continued to live in such a state of barbarous ignorance. It is a proof that some of these men must then have been of a more superior caste of human beings than the rest.

Khajrao is situated one koss distant from Rajnuggur, the Rajah of which sent to express a hope I would pay him a visit on my return: and as I was in his dominions, I thought it was as well to do so in the evening. I found in the ruins of Khajrao seven large *Dewallas*, or Hindoo temples, most beautifully and exquisitely carved as to workmanship, but the sculptor had at times allowed his subject to grow rather warmer than there was any absolute necessity for his doing; indeed, some of the sculptures here were extremely indecent and offensive; which I was at first much surprised to find in temples that are professed to be erected for good purposes, and on account of religion. But the religion of the ancient Hindoos could not have been very chaste if it induced people under the cloak of religion, to design the most disgraceful representations to desecrate their ecclesiastical erections. The palky bearers, however, appeared to take great delight at the sight of those to them very agreeable novelties, which they took good care to point out to all present. I was much struck with the beauty of the

* The impression gives 1173 *Sambat*.

inner roofs of the temples, which were circular, and carved in a most elaborate style.

I told one of the bearers to try and find out whether there were any passage or steps leading to the roof inside or outside the building: as if there were, I intended to pay a visit to it. After searching about for some time, he reported that there was a way; so I went to look at it, and found that the only means which presented itself of access to the upper story, existed on the inside, and from one of the side passages (dark as Erebus), and that it was requisite to ascend by climbing up the sacred images.

From the side wall, which was perpendicular, I first sent up one of the bearers, and then by laying hold of the leg of one god, and the arm of another, the head of a third, and so on, I was luckily enabled, not however without inconvenience, to attain the top of the wall; where, on the roof, I found an aperture, just large enough for me to creep in at. On entering upon the roof, I found that my sole predecessors there for several years before had been evidently the bat and the monkey, and the place was not for that reason the most odoriferous of all places in the world. However, it was necessary that I should see and inspect the nature and formation of these upper stories. The circular roofs, before referred to, were formed by the overlapping of huge long blocks of stone, which stretched from the capital of one pillar to that of another, and upon both of which they are supported. The others are placed so as to fill up the corners of the square (or other angular figure of which the plan of the roof was formed) by other huge long blocks laid across these interstices diagonally, from the centre of one face to centre of another. The same occurred above them, smaller blocks being used as the circle contracted, and as the roof tended towards a point. Here a square stone was laid on, resting upon the superincumbent ones. There was no masonry, I mean no plaster of any kind, used for the purpose of cementing these slabs to one another, their own weight and position alone being sufficient to give them permanence—a permanence which has lasted for ages, and which would, unless disturbed by the growing of trees or other disturbing cause, sempiternally exist. I saw nothing else worthy of notice, only here and there, immense parallelopipedons of stone, in some of which, the presence of holes apparently drilled for the intrusion of the lever for raising them was indicated. There appeared to be no way of returning excepting that by which I had effected my ascent, so I set about my descent as well as I could, for this was more difficult than the ascent; but after resting first one foot, then another, upon any projection I could meet with, I managed to effect, without loss of limb my perilous descent. I

noticed a vast quantity of beautiful sculptures of all kinds, to attempt to describe which would exceed the limits of this work, even if I possessed the means of doing so; but as I do not, and have made no sketches there, I must *per* force be excused from inserting any. Having visited several temples, in all seven, of which the names are as follow, I went to take a look at the rest of the wonders of the place. One temple was dedicated to *Mahadeo;* a second to *Parvatti;* a third to *Kundari;* a fourth to *Lalaji;*(1) in which I found the large inscription; a fifth to *Nandeo,* or the *Mahadeo bullock god;* opposite to which and facing it, in an outer building, contemporaneously erected, is a splendid figure of the largest *bail,* (or ox) I have ever seen; the animal was sitting upright upon the ground, and in this state measures seven feet long, five feet high, and three and quarter feet broad, and weighs by my old way of calculating 68½ tons, or 1872½ maunds. I had not sufficient time to make a drawing of him, being obliged to notice more interesting matters. The sixth temple is consecrated (may I use this term?) to *Chatterbhoj;* and the seventh (what think ye of that reader) to our fourth friend of the Hog species—to *Barao,*(2) and in which there is, without exception, the finest, (and last) but not largest, specimen of this animal I have as yet seen; and I don't think there are many others in India, excepting one of which I know the locality, but have not visited it. The dimensions of this interesting object are as follow—His height is five and three quarter feet, his length eight feet, breadth three and quarter feet; all these dimensions are approximations, made by means of my walking stick, which measures rather more than a yard in length: so that each of them may be perhaps increased by about one inch; his weight will be, according to our method, ninety tons, or about 2461 maunds. This is pretty well for the weight of the gentleman just after breakfast. What the deuce would it be after luncheon? I am happy to say we have in this specimen unequivocal proof of the presence of a complete and well formed snake which is lying under him,(3) partly in an incurvated position, but evidently subdued; the female figure, that should be here has been taken away (confound the rascally despoilers), and nothing remaining of her beautiful form (for I am sure it must have been beautiful, judging from the rest) but two feet, and her hand, which is posited upon the left throat or neck of the

1. Divinities by the name of KUNDARI and LALAJI are not found in the Sanscrit theogonies, they may be familiar designations locally current.

2. The *Varâha Avatâr* of VISHNU is well known.

3. The snake ANANTA or SESHA, which upholds the earth. The child is the infant HARI described as reposing on this snake.

animal. One additional circumstance occurs too in this specimen, which is the remains of a child resting upon the snake's neck. I should conceive that this figure of a child is meant to represent the child of *Prithei*, viz. mankind, born of earth (or *Prithee*), and of whom the fable represents *Hiran*, the snake, to have been the enemy or destroyer, but who has here triumphed, and is resting upon the serpent's neck—"Thou shalt bruise his head, and he shall bruise thy heel." Another very extraordinary fact is, that the tail of the *Barao*, though broken off, (as indeed is that of each of the other specimens) must evidently have joined on to the tail of the reptile; this would seem to convey the idea that the tail was either part of the enemy, or the enemy itself; but this discussion I must leave to the learned, being unable to grapple with it myself. The tusks of the Hog are curved in the finest and most determined manner. I do not recollect in what direction the woman's feet are turned in this specimen, whether towards the animal, or sideways from him. I would willingly have given a hundred rupees (10*l.*) to have had a good sight of the "*Prithee*" creature, (who has been taken away,) and that in a mutilated state too, as they have left her feet and one arm. The *Barao* stands on a fine thick slab raised on a high chabutra, which is accessible by steps formed of red granite, (mind that). The roof is well formed, strong, and likely to last for ages; as is also the Hog. I think he was covered with parallel rows of human figures, like unto the others, but upon this fact I beg to say I do not feel justified in speaking decidedly.

Let us now look in at the little *Mahadeo*, or *lingam*, which is to be seen in another temple, situated not far from this one. In order to arrive at it, it is necessary to ascend a considerable number of steps, at the top of which is situated the representation of the vital principle. Let us now measure the height of the gentleman. The natives objected to my going inside, without taking off my boots, which would have been inconvenient; so standing at the door way, I saw a bearer measure the height with my walking stick, it amounted to $2\frac{2}{3}$ of its height, or eight feet, and its diameter about $1\frac{1}{3}$, or four feet. Its weight will be about $7\frac{1}{2}$ tons, or 207 maunds. It was erected in a receptacle, which was raised from the ground about four feet, and twenty-five feet in diameter. That of the room exceeded it by perhaps three or four feet on each side,—there being a passage all round it. I understand a light is regularly kept burning there during the night time, and it was considered by far the largest lingam in India, and is consequently much venerated. The dimensions of the stone slab from which I copied the inscriptions in the other temple, were $5\frac{1}{2}$ feet length, 3 feet breadth, and $\frac{1}{2}$ foot thickness—its weight is therefore about

12½ hundred weight, or 17 maunds. This stone lies detached from some part of the building (from whence I cannot say) and rests inside one of the temples before mentioned. I must return to state a peculiarity I met with in this *Barao.* His two left legs were both placed foremost; perhaps this was intended to add to his strength or durability, by giving him what they might have considered greater base; but I should doubt whether the base would not have diminished instead of increased by this arrangement. In the other specimens, I think the legs of none were advanced, but as if the animal were standing still. A large tank exists within fifty yards of this Hog, but there was not much water in it at the time I was there. A great deal of jungle surrounds these ruins. Near the water entrance to one temple I found a lion or two (stone ones, not living animals); one of whom seemed to be seizing a wrestler by the left arm, with one paw up and mouth open ready to destroy him. Was this *Narsing,* again, and *Heran kussup?*(4) I had a desperate hunt here (not after a hare) but after my pencil, with which I intended to have "knocked off" the last named figure, but I was obliged to "knock of," altogether (as the sailors say) or leave work, because I could not find it. After sending two or three men to two or three places to hunt for it, I was obliged to depart without making the intended drawing, and after I had progressed about a mile from the place, when it was too late to return, lo, and behold, I found the pencil upon my palanquin drawer. I soon after got to Rajnuggur, but before finally taking leave of the seven temples, I shall state my opinion, that they are most probably the finest aggregate number of temples congregated in one place to be met with in all India, and all are within a stone's throw of one another.

ओंनमः शिवाय ॥

विधुप विकट वटानामजायमानाय वीजभूताय ।
मुदान्तर्नमः पालनविलयक्षते निष्क्रियायापि ॥१॥

तूर्णं घूर्णति यच्च गोचशिखरिश्रटङ्गः समूहखसन्
प्राच्यौषीन्नतमूर्त्तिरार्त्तविरुतं कुर्वन् कुकुङ्कुम्भिना ।
सप्तांभोध्यवधि प्रधूतवसुधावन्धःकवन्धीकृतः
स्ताम्भाद्रिः क्षयकाण्डताण्डवविधिः शैवः शिवायास्तुवः ॥२॥

4. HIRANYA KASIPU, Gold-clad, or *Daitya* or *Titan*; for whose destruction VISHNU took the form of the man-lion.

कस्त्वं द्वारि दिगम्बरः क्षपणकः कस्मादकस्मादहो
वामे शूलधरो धिगायुधविधिं वर्हास्त्वदर्हाननु ।
मां जानीहि महेश्वरं स्फुटमिदं वक्षेप्यभावे स्थितिः
प्रेयस्याः परिहासतो विहसितः शम्भुः शिवायास्तुवः ॥३॥

पशुपतिवदनच्छन्नानि क्षतवसतिः पद्मसद्मनि सदा या ।
जयति विलक्षणरूपा मुक्ताभा भारती चेयं ॥४॥

गिरिशशिरसि यच्छन् हस्तमिन्दोः कलायां
मृदुकमलमृणालायांशगृध्नुः शिशुत्वे ।
जयतिविधुतमूर्द्धोन्नाल नीलाम्बुजेन
स्मितकुपितमृडानीताडितो नागवत्सः ॥५॥

कल्पादौ किल केवलं खमखिलं ध्वान्तावनद्धं ध्रुवं
शून्यं वीक्ष्य सिसृक्षतो जगदभूद्वादमुद्रोनिलः।
तत्राभूदनलोनलाज्जलमभूदीजादमोघाज्जला
ज्ज्वालामालि हिरण्मयं महदभूदण्डं विभोर्ब्रह्मणः ॥६॥

तदण्डभाण्डखण्डाभ्यां सप्तैवं विदधे धियां ।
ब्रह्मा ब्रह्मनिधीन् पुत्रान् मरीचिप्रमुखान् मुनीन् ॥७॥

मध्ये तेषां प्रहततमसां मानसानां मुनीनां
श्रीमानत्रिः प्रथितमहिमा नेत्रपात्रैः प्रसूतं ॥
यस्य ज्योतिःपटलजटिलं मण्डलं वह्निमिन्दो
श्चान्द्रात्रेयः समजनि मुनिस्तस्य पुत्रः पवित्रः ॥८॥

द्वरापास्तसमस्तसंशयविपर्य्यासप्रकामोज्ज्वल
क्रान्तालोकविलोकिताखिलजगत् स्वर्गापवर्गस्थितेः ।
सर्वज्ञप्रतिमस्य तस्य क्षतिनः कान्तस्य पुण्यात्मनः
पारं गन्तुमतस्तदीयमहसः कोवा महिम्नां क्षमः ॥९॥

नीरन्ध्रो नितरां निसर्गसरलः सारोत्तमोभ्युन्नतो
निर्ग्रन्थिः प्रथुलायभागशुभगः पर्व्वस्वखर्व्वस्थितिः ।
आमूलं फलितोथ सेवितविपत्क्रूरारिदावाग्निना
न म्लानिं गमितस्ततः समभवद्दाश्वर्य्यमात्यद्भुतः ॥१०॥

आचन्द्रं चन्द्रावेयवंशजाः क्षितिभुजः क्षितिमाद्योतते ॥११॥

ये पूर्व्वं नृपविष्ठितक्षितितलाः संक्रान्तधर्म्मप्रियाः
प्राणप्रार्थनयाप्यखिन्नमनसः पर्य्याप्तसत्यव्रताः ।
निःसिन्दूरितदुर्व्विनोत वलवत् सामन्तसीमन्तिनी
सीमन्ताः पृथिवीभुजो विजयिनस्तेभ्योखिलेभ्यो नमः ॥१२॥

कालेनेह महावंशे प्रशंसाप्रांशुरंशुमान् ।
मुक्तामणिरिव श्रीमान्नन्नुकोभून्महीपतिः ॥१३॥

तेन विक्रमवलेन धन्विना क्रामता युधिवधाय विद्विषाम् ।
धुन्वता धनुरधिज्यमर्जुनं स्मारितादिवि विमानगामिनः ॥१४॥

तस्मादुदारकीर्त्तिरजनि जनानन्दसुन्दरः श्रीमान् ।
तनयो विनयविधाने वाक्पतिरिव वाग्यतिक्षितिपः ॥१५॥

विद्यावदातसदयेन कविप्रजानामातङ्कशङ्कुमकलङ्कितविक्रमेण ।
तेनापनीय भयनिर्मललोचनेन सङ्कोचिताः पृथुककुन्दुकथार्थ
कन्थाः ॥१६॥

तस्य क्षमातिलकस्य लोकतिलकः पृथ्वीपतेर्भूपतिः
स श्रीमान् विजयो जयाय कुशली जज्ञे क्षतज्ञः सुतः ।
यस्योदात्तमतेः प्रसूतिसमये धर्म्म्या महिम्नां निधेः
सानन्दं सुरसुन्दरीभिरवनौ क्षिप्ताः सलाजाः स्रजः ॥१७॥

किन्नरीभिरधिकं धरासखीराकलय्य विजयस्य भूभुजः ।
काकलीकलमगीयत स्फुरत् प्रोच्चमुल्लुलकमुज्ज्वलं यशः ॥१८॥

विनयनतसुमित्रापत्यसम्बाहिताङ्घिः
प्रवरहरितभूमिः क्रान्तपर्य्यन्तभूमिः ।
सुहृदुपहृतिदक्षो दक्षिणाशां जिगीषुः
पुनरवितथयोधे धन्वते [5] तूर्य्यमर्य्यः ॥१९॥

तस्मान्नृपतिसमुद्रादुदपादि नरेन्द्रचन्द्रमाः ।
स्पृहणीयः श्रीवाहिलनामा विहततमा वन्दिवाग्ध्युदयः ॥२०॥

प्रसन्ने तत्र भूपाले प्रसरच्चित्रभानवः ।
प्राभवन्नमितावासाः सरोषे द्विषदालयाः ॥२१॥

कोशपानमसिधारयोषितं प्रान्वभून्न जनरत्नसम्पदां ।
पक्षपातमिषुषु स्वभूपुरे प्रापुरस्य न सुहृत् सभासदः ॥२२॥

तस्मात्तीव्रप्रतापोज्ज्वलनकवलितोत्तानभूपालतूलात्
संपश्चीतद्रुमाणामनणुगुणगणालङ्कृतेः कीर्त्तिहर्तुः ।
सश्रीहर्षारिहर्षज्वरहरणमणिः क्षीणनिःशेषदोषः
सन्तोषाय प्रजानामजनि निजभुजाक्रान्तविभ्रान्तकीर्त्तिः ॥२३॥

यं दृष्ट्वैव कृपाणपाणिमकृतन्यापातभावं युधे
क्रोधाक्रान्तविलोचनोत्पलदलभ्रूभङ्गसीमाननं ।
उत्साहोहृदयार्दतः [6] करतलाद्राधोमुखाः कीर्त्तयो
दिग्भ्यः साध्वसवेपमानवपुषस्तस्थुः परेषां क्रमात् ॥२४॥

तेनाच्युतेन भीमेन वाणेन कृतवर्मणा ।
समुद्रपरिखा पृथ्वी पुरी शूरेण रक्षिता ॥२५॥

5. *Sic in Orig.*: but it seems an error of the engraver.
6. *Sic in Orig.* There appears an error of the engraver, the words *utsáhohadoyárdra-toh* give no intelligible sense, and are omitted in the translation.

अपच्चधर्म्मारिविचच्चणक्रमः सदैव दोषाकरसङ्गभङ्गुरः ।
विनिष्ठतक्रूरभुजङ्गभङ्गुरस्तिरस्करोति स्स सतूर्णमर्णवं ॥२६॥

हस्तापास्तप्रवरतुरगैर्द्दूरमुक्तासपत्नै
र्द्दूरारातेः सपदि शिरसा शासनं धारयद्भिः ।
तस्य द्वारि द्विरदमदनिःस्यन्दपङ्काङ्कितायां
सेवाहेतोः प्रणतिपरमैराश्रितं भूमिपालैः ॥२७॥

चन्द्रोज्ज्वलगुणा वर्च्चोमहार्घा हृदयङ्गमा ।
हारावलीव तस्यासीत् कंकुतेति प्रियोत्तरा ॥२८॥

वर्णः स्वर्णरुचिर्विलोचनयुगं नीलं सचन्द्रोत्पलं
पाणिः शोणमणिर्द्युतिः सचरणा दन्तच्छदोविद्रुमः ।
सद्यःशुक्तिविमुक्तमौक्तिकतलच्छन्तु चेतोयतः
क्षीरब्धं भुवनैकभूषणमभूत् तत्सङ्गमे कामिनी ॥२९॥

तस्यास्तस्य स्मरणविहिताघौघविध्वंसनायाः
सत्तीर्थायाखिदशसरितः सन्ततेः पुण्यकीर्त्तेः ।
धर्म्माधारः पितरि सुतरां साधुरिङ्वप्रभावो
भीष्मोपेन्द्रभवज्ञातिसुतः श्रीयशोधर्म्मदवः ॥३०॥

तस्य विप्रचरणप्रणामजं रञ्जितं शिरसि सुश्रियं रजः ।
अन्यकालपलिताङ्कितिं दधत् सन्दधावधिककामनीयकं ॥३१॥

एकस्मै याचमानाय द्विजाय पलदः शिविः ।
यावदर्थिजनं प्रादात् कोटिकोटिमसौनृपः ॥३२॥

रत्नं भूमिलितालिकेन सदसि न्यस्तं सचेतायितं
गन्तुं पत्रपुरःसरेण चरणैः स्थानं प्रभाविस्मितं ।
वक्तुं जीवजयादिशो नतिचयं कर्त्तुं विनीताकृति
स्तस्मिन्नाजनि राजकेन जयिनि त्रासादिदं लक्षितं ॥३३॥

नित्योदितेन्दुभुजगाधिपधाम नित्य
मानन्दिकुन्दकुसुमं गगनाङ्गणं वा ।
तेनाद्य तद्द्वयमिदं यशसाभ्यधायि
संव्यापितं सितसुधाधवलं चरित्रं ॥३४॥

सन्नसन्निमहिमतुल्यः सन्नाकूपारपारदृश्वापि ।
न पुनरिहतस्य नृपतेर्गुणसागरपारगः कश्चित् ॥३५॥

गांधारीं भजता प्रहृष्टशकुनिस्वानप्रियां प्रेयसीं
भीष्मद्रोणनरास्यकर्णमुखदोःप्याकर्ण्य संमूर्छता ।
तद्वर्म्मप्रभवावबोधितवता प्राप्यापि वंशक्षयं
नप्राप्ता धृतराष्ट्रता समुदयोविद्वेविणेत्यद्भुतं ॥३६॥

कस्मात् षष्टिसहस्रसूरिभिरसून् व्युत्सृज्य खातः क्षत
स्तत्पौत्रप्रमुखैः पुनस्त्रिभिरासवम्भोभिरापूरितः ।
वृत्तान्तं सगरस्य सागरविधावाकर्ण्यतूर्णं मुधा
स्पर्धावानधिकं व्यधत्त जलधेर्वेलत्तडागार्णवं ॥३७॥

वेश्मेदं शारदेन्दु द्युतिसुरभिखुरच्चुण्णभग्नाक्षपादं
पृक्तंचक्षुष्यमुष्मादपथयति रथं सारथिः सन्नसन्नेः ।
यत्कुम्भः शातकुम्भस्तुहिनगिरिशिरश्चुंविविम्बार्कतर्कं
कुर्वन्नास्ते समग्रतां मुदमसुररिपोर्वेश्मवैकुण्ठमूर्तेः ॥३८॥

भद्दावंशसमुत्पन्ना प्रसन्नावनितावनौ ।
नर्म्मदेवाभवद्देवी पुण्या तस्य महीपतेः ॥३९॥

सदानसूया विहितागसेष्यसावरुन्धती जीवितमप्युपासिता ।
बभौ मदान्धं क्षमयन्त्यनिन्दिता मदालसाभून्नपुनः कथंचन ॥४०॥

सा देवी नरदेवाद्देवाधिपतेः सचीव सच्चरित्रं ।
तस्मादसूत पूतं जयंतमिव वङ्गमङ्गभुवं ॥४१॥

यशोदानन्दतां चक्रे पुतनामारणक्रियां ।
जातो वृष्णिकुले कंसरिपोश्छेत्ता नरोत्तमः ॥४२॥

तस्मादवाधितक्रोधान्नृसिंहान्नखलाविनः ।
हिरण्यकशिपुप्राणत्राणं चक्रे न केनचित् ॥४३॥

देवाकर्णय कोशलेश्वरमितस्तूर्णं समाकर्ण्यता
मादेशः क्रथनाथ सिंहलपते नत्वा बहिः स्थीयतां ।
त्वं विज्ञापय कुन्तलेन्द्रवदने दत्त्वोत्तरीयाञ्चलं
नर्म्मस्थानगतस्य वेत्रिभिरिति त्यक्तुं समुक्तं वचः ॥४४॥

का त्वं काशीनृपतिवनिता कात्वमन्ध्राद्रिपत्नी
कात्वं राढापरिवृढवधूः का त्वमङ्गेन्द्रपत्नी ।
इत्यालापाः समरजयिनो यस्य वैरिप्रियाणां
कारागारे सजलनयनेन्दीवराणां बभूवुः ॥४५॥

का त्वं कस्य किमर्थमत्रभवती प्राप्ता शशाङ्कोज्ज्वला
स्फूर्जत् कीर्तिरहं बुधैकसुहृदः श्रीवङ्गपृथ्वीपतेः ।
भ्रान्ता विश्वमशेषमागतवती स्फारीभवत् कौतुका
लोकालोकमहामहीधरशिखरस्थायिश्रियं वीक्षितुं ॥४६॥

मरकतमयं स्वङ्गं लिङ्गं यदर्चितमैश्वरं
चिदशपतिना तस्माल्लब्धं प्रसाध्य किरीटिना ।
तदवनितलं तेनानीतं युधिष्ठिरपूजितं
जयति जगति श्रीवङ्गेन प्रणम्य निवेशितं ॥४७॥

वेश्मन्यश्ममयस्तेन भूपालेन प्रतिष्ठितः ।
द्वितीयो द्योतते देवः क्लेशपाशहरो हरः ॥४८॥

तेनायं शरदभ्रशुभ्रशिखरः श्रीवङ्गपृथ्वीभुजा
प्रासादस्त्रिदशप्रभोर्भगवतः शम्भोः समुत्तम्भितः ।
यस्याभ्रंकषकालधौतकलसप्रान्तस्खलत्स्पन्दतो
मेरोः शृङ्गमतुङ्गमेव तनुते चित्रायमाणोरुणः ॥४९॥

तस्याभ्रंकषशृङ्गशिल्पे शरीरिषु कुतः ससावेशः ।
स्वयमेव विश्वकर्म्मा तोरणरचनामिमां चक्रे ॥५०॥

जयति विकटवटोयंहाटककोटीरनेन तुलयित्वा ।
स्वतुलित तुलापुरुषाः शतशोविश्राणितास्तेन ॥५१॥

सद्वर्म्मातिरतारताः परहिते संशुद्धवंशोद्भवाः
प्रारब्धाध्वरधूम धूम्रवपुषोप्येकान्ततोनिर्मलाः ।
सप्तैतेधनधान्य वित्तवसुधादानेन संमानिताः
सौधेषु स्फटिकाद्रिकूटनिकटे प्रारोपिता ब्राह्मणाः ॥५२॥

द्वयंसुब्रह्मकल्पेषु यवैकं प्रतिवासिषु ।
दक्षिणेन तुषाराद्रिं कल्पयामो परोभवत् ॥५३॥

रक्षित्वा क्षितिमम्बुराशिरसना मेतामनन्यायतिं
जीवित्वा शरदां शतं सनवकं श्रीवङ्गपृथ्वीपतिः ।
रुद्रं मुद्रितलोचनः स्वहृदये न्यायाज्जपन् जान्हवी
कालिन्द्योः सलिले कलेवरपरित्यागादगान्निर्वृतिं ॥५४॥

धर्म्माधिकारमनुशासति शाखतीच
मिश्रे सतां स्फुरितधामनि धर्म्मबुद्धौ ।
धीमद्यशोन्धरपुरोधसि वेदगीते
सिद्धिं जगाम जगतीपतिकीर्त्तिरेषा ॥५५॥

त्वाच्चारिकप्रवरसावरवंशजन्मा
श्रीनन्दनः कविरभूत् कविचक्रवर्त्ती ।
तस्यात्मजः समजनि श्रुतपारदृश्वा
श्रीमांस्तपोधिकवलो वलभद्रनामा ॥५६॥

सूनुः सूनृतगीर्गिरीन्द्रगरिमा भद्रस्य तस्याभवत्
भूपालैर्भुविवन्दिताङ्घ्रिरनघः साहित्यरत्नाकरः ।
श्रीरामो रमणीयसूक्तिरचनाचातुर्य्यधुर्य्यः क्षती
तेनेयं विहिता प्रशस्तिरतुला तत्रालये सूचिता ॥५७॥

न संकीर्णावर्णाः क्वचिदिह न सापत्न्यकलुषाः
स्थिताः कायस्थेन प्रथितकुलशीलोज्ज्वलधिया ।
पशुंपालेनायं विहितपदविद्येन लिखितः
प्रशस्तेर्विन्यासः क्षतयुगसमाचारसदृशः ॥५८॥

विज्ञानविश्वकर्त्रा धर्म्माचारेण सूत्रधारेण ।
चिच्छाभिधेन विदधे प्रासादः प्रमथनाथस्य ॥५९॥

यावत् पृथ्वी सपृथ्वीधरनगरवनोदन्तमुद्रासमुद्रै
र्यावद्भ्राजिष्णुरूष्णद्युतिरयममृतस्यन्दनः शीतरश्मिः ।
यावद्ब्रह्माण्डभाण्डस्थितिरियमथवा व्याप्तता स्थाणवीयः
प्रासादस्तावदेष व्रजतु नरपतेर्दत्तकैलासहासः ॥६०॥

लिपिज्ञानविधिज्ञेन प्राज्ञेन गुणशालिना ।
सिंहेनेयं समुत्कीर्णा सद्वर्णारूपशालिनी ॥६१॥ संवत् १०१९॥

श्रीपृथ्वीपतिराजश्रीवज्रदेवराज्ये श्रीमरकतेश्वरस्य
प्रशस्तिः सिद्धा

उद्यतोच्चमहोभृतोमसृणिता मत्तद्विपतापदैर्ह्रीता: ।
सङ्गरसङ्गभङ्गुररिपुपुत्रप्रियाश्रूत्करैः ॥६२॥

दिग्दन्ती जयवर्म्मदेवनृपतिः कीर्णाक्षरैर्योलिख
त्तेनालेखि पुनः प्रशस्तिरमलैरेषाक्षरैः क्ष्माभुजा ।
विद्वद्भिर्जयपालहस्तकरणोऽमून्यादराद्ददितो
गौडः सोलिखदक्षराणि ककुदाकाराणि वंशाङ्कुरः ॥६३॥

कायस्थो जयवर्म्मदेवनृपतेर्वंशस्य दीप्यत्कला
साहित्यांबुधितः समुद्गततमोरुन्धन्ननिन्द्यद्युतिः । संवत् ११७३
वैशाख सुदी २ शुक्रे

Translated by J. C. C. SUTHERLAND.

SALUTATION TO SIVA.

1. With internal joy be there reverence, to the unborn God, the cause of those vast holy fig trees, which approach the moon: who himself devoid of action, is the preserver and destroyer.

2. For your welfare (*saiva*) be the mystic dance of the god, which occurs at periods of annihilation; in which rapidly whirl the summits of all the crested mountains, and in which, that mount (affixing as it were the earth shaken to the seventh sea), becoming like a headless but yet panting corse, falls a prostrate image,—trembling and whining by the voices of its elephants.

3. "Who art thou on the threshold, naked and abject? How "unreasonably dost thou bear a trident in thy left hand. Fie on this "warlike shew. Truly those peacock's feathers become thee!" Thus gibed by his beloved, the god with a smile replies, "Know me to be MAHESVARA." "It is clear indeed, (she adds) and the confirmation is in your want of clothes." May that god SAMBHU be for your welfare.

4. This beautiful BHA'RATI(7) too excels, resplendent as pearl; she who ever dwells in her lotus abode on the face of PASU-PATI.(8)

7. *Sarasvati*—eloquence personified.
8. Name of SIVA as lord of the animate world.

5. Excellent is that young elephant, who in his immature age, eager to snatch the tender filaments of the lotus, thrusts his proboscis on the section of the moon, fixed on the brow of *Siva*, and who is struck by MRID'A'NI' (smiling in her anger) with the agitated lotus sprout on her head (9)

6. Truly, in the beginning of the *kalpa*, the universe proceeded from BRAHMA wishing to create, when he had perceived the eternal void, enveloped in darkness and merely atmosphere. From him, when he had finished, proceeded the air. In that was produced fire; from fire proceeded water; from that prolific cause proceeded BRAHMA's vast golden egg, streaked with rays of light.

7. By his wisdom, from the two segments of that egg BRAHMA created his sons, the seven *Munis* (MARICHI and the rest) the abode of holiness.

8. Amongst these dark-dispelling, intelligent *Munis*, was the illustrious ATRI of celebrated greatness; in the cavity of whose eye, was produced the orb of the moon, whose abundant light radiates like luxuriant hair. From him was born his pure son CHANDRATREYA.

9. Who can measure the glory and greatness of that holy man, the beloved image of the Omniscient, pure in soul; of him, who hath assured heaven and beatitude to the whole world, illumined with light, surpassed by his excessive splendor, dispelling all doubt and illusion?

10. From him sprung the wonderful VAYVARYAMA—faultless—naturally upright—of excellent disposition—eminent—unprejudiced—symmetrical from his large upper extremities—not slightly observant of fasts—fruitful to the root,—and never wasted by the spontaneous fire of cruel foes, the votaries of misfortune.(10)

11. As long as the moon (endures) the sovereigns of the race of *Chandratreya* illuminate the earth. [*The rest of this sloka is wanting.*]

12. Reverence to those ancient monarchs through whom the surface of the earth was encompassed by kings, who were friendly to the faith which has descended down—unvexed even when their lives were begged—strictly adhering to truth—who robbed of vermilion tint, the coronal streaks(11) of the wives of the powerful but rebellious chieftains.

9. DURGA' is described as fondling a young Elephant. One of SIVA's names is MRIDA', or delighted; whence his consort is called MRID'A'NI.

10. A double meaning pervades this verse; the epithets have a twofold sense, one applicable to the saint, and one to a tree. It would be impossible to preserve the *double entendre* in the translation.

11. The *Hindu* wife stains the line on the head made by the partition of the hair with red lead. The widow abstains from this and other ornaments.

13. In process of time in this great race the illustrious NANNUKA became sovereign; exalted in panegeric, and radiant with splendor,—like a gem amongst pearls.

14. The chariot-borne denizens of the sky were reminded of ARJUNA, by that stalwart bowman, rushing on to destroy his foes and brandishing his strung bow.

15. From him sprang an illustrious son, the sovereign VAG-YATI, of excellent fame—celebrated by the happiness of mankind, and like VAKPATI(12) in the observance of courtesy.

16. By that matchless warrior—whose eye was bright like the snake's—and who was kind to those eminent for learning—the shreds of anecdotes of PRITHUKA and KUNDA were put to shame, when he had dispelled the keen fear of his poet subjects.(13)

17. Of him, (the ornament of the earth) was born a grateful son the illustrious VIJAYA, renowned for victory; on the birth of which magnanimous treasure of greatness, holy garlands with parched corn, *(laja)* (14) were scattered down by the delighted wives of the immortals.

18. By divine choristers, joined by their earthly companions, was melodiously warbled the bright and exalted glory of the sovereign VIJAYA.

19. Like that snake, who is bent in humility, when made to uphold [the earth] by the son of SUMITRA' (15)—rich in his extended verdant plains—conqueror throughout the world—that lord (skilled to reward his friends) about to subdue the southern quarters, once again in no mimic war, sounds his martial musick.

20. From that monarch, resembling as it were the ocean, was born the amiable king VAHILA, the moon of men; by whom, darkness was dispelled, and who bade pour forth the stream of poet's praise.

21. Innumerable houses became pervaded by brilliant light when the king was pleased; so also the mansions of his enemies, when he was angered.(16)

22. In regard to gems and the wealth of the people *Kosa pána* in its sense of ordeal, was not known; but in its sense of adhering to the scabbard, was familiar to their swords. *Paxapáta,* in the sense of

12. A name of VACHASPATI the *Guru* of the Gods.

13. These are Pauranik Heroes, to whom various feats of valor and generosity are attributed.

14. *Laja,* vulgarly called Khoi.

15. LAXMANA.

16. A double entendre or pun (the rhetorical figure *slesh*) pervades this *Sloka.* Indeed an epithet is construed with each of the antithetic members. It is said to be a stalk with two flowers.

loss of plumage, did exist in his capital in respect to arrows; but in the sense of partiality was not obtained by his friendly courtiers.(17)

23. From him, by the blaze of whose intense glory, great kings were consumed like cotton—from him, graced with every eminent virtue, who robbed of their renown wide spreading trees—was born, for the delight of mankind, that SRI HARSHA,—a gem dispelling (as it were a fever)(18) the joy of his enemies, who (exempt from every sin) by his own right arm, subdued capricious glory.

24. Unconquered in war—armed with a sword—with his face dilated by the frown above the petals of his lotus-like eyes inflamed with anger—whom, having seen, the glories of his enemies gradually receded from all quarters, with faces quailing as if under the palm of his hand, and with bodies now trembling with fear.

25. The sea-girt world like a citadel was preserved by that mailed hero, by means of his unerring and terrific arm.

26. Skilled to counteract his enemies, he soon reproached the sea; for he was unaddicted to partiality (*apaxá dharma*), and was averse to association with the evil minded (*doshá kara*), and inimical to vile and cruel detractors (*bhujanga*).(19)

27. Kings (who by their hands were able to push aside strong horses) cheerfully submitting to his dominion, would eat at the threshold of that hero—stained as it was by the mud caused by the exudations from the heads of elephants.

28. His most beloved wife was KANKUTA, like a necklace, being bright as the lustre of the moon; inestimable, and heart penetrating.

29. She, who longed for his society, was the ornament of women—the sole grace of the world. For her colour shone like gold—her eyes were like the dark lotus, which expands before the moon—her hand was ruby-red—grace was in her steps—her lips were of coral—and her mind was pure like the pearl itself, just emancipated from its parent shell.

30. Of him and her (the offspring of the celestial *Ganga*(20) of pure renown, the remembrance of whom destroys a multitude of sins

17. This verse is in the true vein of Sanscrit pedantry. The words explanatory of the double sense of the words (on which the poet puns) are of course wanting in the original.

18. There is a fabulous gem by contact with which fire loses its combustive virtue. It is here alluded to.

19. The influence of the moon on the tides has been long known to the Indians, and is often alluded to in *Sanscrit* poetry. According to the *paxa*, or semi-lunation, the tides increase or decrease; the sea is thus said to be affected by the *paxa*. It is likewise not indifferent to the *Doshákara*, the moon, or night-maker. It abounds also with *Bhujanga*, serpents. It is probable that the pedantic author of these verses, some of which are in the true poetic vein, considered the puns of this stanza as his *chef d'œuvre*.

20. It is indicated that KANKUTA was of the *Gangetic* race.

and abounds in holy shrines) the son was YASO-DHARMA DEVA, the abode of virtue, naturally obedient to his father, of great prowess, and creating a doubt whether he was BHISHMA or UPENDRA.(21)

31. Though shewing like premature grey hairs, still the brilliantly white dust on his head (received in prostration to the feet of Brahmins) obtained increased beauty.

32. SIVI only gave a piece of his flesh (*pal*) to a single bird (*dvija*) (22) who begged it; but that king bestowed millions on all who asked.

33. Through awe of that victorious monarch, kings conceived these notions;—when prostrating their foreheads on the ground, that he was an animated gem;—when preceding his equipage, that to march on foot was an office distinguished by dignity;—that to speak to him, was as if on every side there were life and triumph;—and that to make every sort of obeisance, was a graceful attitude.

34. His brilliant conduct covered with glory, as if overspread by a coat of white plaster, now placed him on a level with these miracles,—the mansion of the king of snakes, ever illuminated by the moon—and the expanse of the atmosphere strewed with jasmine flowers.(23)

35. Though in greatness rivalling the luminary borne by seven horses, and capable of seeing beyond the seven seas, no man in this world could scan the ocean of his mind.

36. When his power was annihilated, dominion (*Dhrita-rashtra*) and prosperity were denied to the enemy—who poured forth those plaintive notes (*Gandhàri*) grateful as the warbling of a bird (*Sakuni*); who fainted at hearing the mangling by terrific (*bhishma*) crows (*Drona*) of the ears (*Karna*) and faces (*Asya*) of men (*Nara*) —and who was now conscious of that hero's valor and prowess (*Dharma prabhava*). This was strange.(24)

21. BHI'SHMA was the son of GANGA; his father was SANTANU: he was general of DURYODHANA, the opponent of his cousin YUDHISTHARA. UPENDRA is a name of KRISHNA.

22. A passage in the *Mahabharat* is alluded to. SIVI was celebrated for his generosity; a bird demanded surrender of his prey which had taken refuge with SIVI. His offer of other food is rejected, and the victim or a piece of SIVI's own flesh insisted on. The just and generous king complies with the latter alternative. Puns again are perpetrated on the words *pal* and *dwija*, which signify a weight and a *Brahman* respectively, besides the senses taken in the translation. The partakers of YASO DHARMA DEVA's liberality were *Brahmans*.

23. These are impossible events, something like Virgil's leaves inscribed with king's names.

24. A play on the words runs through this Sloka—DHRITA-RASHTRA was husband of GANDHARI, the sister of SAKUNI. BHISMA, DRONA, KURNA, and NARASYA, are generals of DHRISTA-RASHTRA and his son DURYODHANA. DHARMA-PRABHAVA is a name of YUDHISHTARA, nephew of DHRITA-RASHTRA. See *Sri Bhagavat Purana*. The ambiguity is lost in the translation. BHISMA and the rest might be taken as the CLOANTHI and GYAANTES of the enemy's army with less outrage to common sense.

37. What boots it that a ditch was dug by the sixty thousand royal sons of SAGAR who devoted their lives; and that it was filled with water by his grandson and two other descendants in the first and second degree? Hearing the narrative of the origin of the sea (*Sagar*), he idly emulous made a vast undulating lake greater than the sea itself.(25)

38. Resplendent as the autumnal moon, as soon as that palace, which had bruised the horses' hoofs and shattered the chariot wheels, was seen by the charioteer of the sun, he swerved his car from its path, —that palace of which the golden ball, gave the idea of the solar disc kissing the summits of the snowy mountains, and constituted the delight of the household image of VAYKUNTA, the foe of demons.

39. Of that great king the chaste queen was NARMA DEVA, high-born, happy, and beloved on earth.

40. Even when injured she was always unresenting; but when benefited, lavish of her life; forgiving the arrogant, but never addicted to pride herself.

41. The queen bore to that god amongst men a virtuous and pure son, BANGA;—just as SACHI bore JAYANTA to the Ruler of the Gods (INDRA).

42. That best of men (*Narottama*) born in the race of VRISHNI, the cleaver of the skulls of his foe, surnamed pure (PUTA NAMA) imparted gladness to his encomiasts, (*Yasodā 'nandatá*) and adhered to peaceful pursuits.(26)

43. By that lion-like man, resistless in his anger, safety of life was never allowed to the robber of gold (*Hiranya Kasipu*).(27)

44. "May it please your Majesty from this place to listen to the "lord of *Kosala* (Oude)?" "Lord of *Kratha* let the mandate be "quickly heard." "Oh Ruler of *Sinhala* (Ceylon) prostrate yourself, "and stand outside." "Speak chief of *Kuntala*, first putting up your "cloth to your mouth." Such were the words spoken by the door-

25. Allusion to the *Puranic* origin of the Ocean is made. SAGUR had determined to reap the fruit of an *Aswa-Meddha*. The first stage of this is the release of the victim-horse with a label. When fairly caught after battle with rivals he is slain, and the sacrificer obtains his vow. INDRA alarmed for his throne had the labelled horse picketted in *Patála*, in the centre of the earth, before the *Muni* KAPILA. SAGAR'S sons baffled in their chase dug for the victim. Finding him, they abused the *Muni*, by whose curse they became ashes. By the successive austerities of ANSUMAN, DILIPA, and BHAGIRATHA, grandson, great grandson, and great great grandson of SAGAR, the celestial Ganges was brought on earth, and filling the excavation, reanimated the ashes of their progenitors who ascended to heaven. The poet indicates that YASODHURMA DEVA dug a great Tank.

26. A play on words pervades this stanza. It may refer to KRISHNA or NAROTTAMA, also called PUTANAMA, who was the delight of YASODA, his adoptive mother.

27. The same *Jeu de mots* is kept up.

keepers to dismiss attending kings when he had retired into the female apartments.

45. "Who art thou?" "The beloved of KA'SHI'S lord;" and thou? "The wife of the king of *Andhra;*" and thou? "The spouse of the chief "of *Radha;*" and thou? "The bride of the prince of *Anga.*"—Such were the colloquies with the wives of his enemies detained as captives, while their lotus-like eyes were suffused with tears.

46. "Who art thou? of whom? and for what object art thou "come; thou who art resplendent as the luminary whose emblem is "the hare?" "I am gleaming fame; and wandering over the universe, "I am come, fervently anxious to behold the glory of the monarch "BANGA, the sole friend of the learned, which has reached the crest of "the vast mountain of *Lokálok.*"(28)

47. Placed by BANGA, after prostration made, that divine symmetrical *Linga* made of emerald, is victorious in this world. Worshipped by INDRA, it was obtained from him by ARJUNA, who had pleased him and brought by him on earth, and adored by YUDHISHTARA.

48. In the fane, a stone god put up by that king shews a second HARA, the remover of the bonds of pain.

49. By that King BANGA was erected this fane of the lord SAMBHU, the chief of the gods, with its summit, bright like the autumnal clouds; of which, by gliding near the golden cupola, (furrowing as it were the sky) ARUNA, rendered radiant, abashed the crest of MERU.(29)

50. For the nice construction of its spire the skill of no mortal could have availed; VISWA KARMA(30) himself must have turned this arch.

51. How this vast *Vata* tree surpasses!—A hundred times were given by him crores of golden coins, in quantities equiponderous with his body, by which they were weighed.

52. Enthusiastic in the true faith, and delighting to benefit others, seven high born *Brahmins* were located in palaces, reverenced by gifts of wealth, grain, and lands;—perfectly pure, though their bodies were tinged by smoke from ever-enduring sacrifice.

53. Two *yavas* at *Sri-Brahma Kalpa;* one in the vicinity. On the south of the snowy mountain, *Kalpa gram* was another.

54. Having ruled this earth, girt with waters as if by a girdle, and unsubjected to any other; when he had lived 109 autumns, with eyes closed, and (as ordained) fervently reciting the name of RUDRA, the royal BANGA obtained final beatitude by abandoning this mortal coil in the conflux of the *Yamuna* and *Ganges.*

28. The Sun never reaches this mountain.
29. *Aruna* is the Dawn, the charioteer of the Sun.
30. The celestial architect.

55. Then did this glory of the world's lord attain perfection, when the wise priest YASONDHARA, skilled in the *vedas*, and the friend of the gods, here administered—according to law—scattering light on jurisprudence.

56. Born in the tribe of TWAXARA, and in the family of SAVARA, was a poet called SRI NANDANA, the prince of bards. To him was born a son, the illustrious BAL BHADRA, who had read through revealed law, and was powerful by the observance of religious austerities.

57. Of that BAL BHADRA, SRI RAMA was the son; great as it were like a vast mountain,—of pleasing speech,—whose feet earthly kings adored,—exempt from sin,—and celebrated as the ocean of literature, —and skilled in elegant composition. By him composed, this incomparable panegyric was published in the temple.

58. Who had learned the science of words,—by the sensible KAYASTHA PASAMPALA, distinguished by his race and disposition, the transcript of this panegyric was arranged. Here are no confused letters nor any obscure from rivalry.(31)

59. This temple of PRAMATHA NATH was constructed by the architect XIÇÇHA, virtuous, and a VISWA KARMA in science.

60. As long as this world with its mountains, cities, forests, its histories, memorials, and seas [shall remain]; as long as this sun shall shine; as long as water shall ooze from the luminary whose rays are cool; as long as the segment of the divine egg shall be fixed, that is expanded; so long let this temple, dedicated by the monarch to SIVA endure,—mocking as it does mount *Kailasa*.

61. By the wise, and gifted SINGHA skilled in the science of writing, was this specimen of calligraphy engraved. *Sambat* 1019.

In the reign of Raja BANGA, lord of the earth, this PANEGYRIC OF THE EMERALD IMAGE was finished.—

62. Afflicting even infuriated elephants,—by the abundant tears of the children and wives of his enemies (broken in the conflict of war) of that great king these lines became obliterated.

63. The king JAYAVARMA DEVA (like an elephant supporting the universe) rewrote in clear letters the above verses, which he had before written in irregular letters (*kirna*). These letters, in the *Kakuda* form that GAUDA KAYASTHA, aided by the learned, inscribed by the hand of JAYA PAL,—that *Kayastha* of untarnished lustre, having a numerous progeny, the radiant moon of the king's race, who, the dispeller of gloom, had risen from the ocean of polished literature.

Sambat 1173. *Friday* 3 *Vaisakh (Sudi) bright half.*

31. The distinction of nearly uniform is preserved.

Prosodial Key.

A sloka, or stanza, consists of four *padas*, lines, or quarter slokas. They are generally, but not always, identical. Metre is *Jati*, or measured by *matras*, or instants. In this, one long syllable and two short syllables are equivalent. Or it is *Vritta*, scanned by defined feet.

The following slokas are *Jati* of the *Arya* species. First and third *padas* have 12 *matras*: second has 18; and fourth has 15 *matras*.

1. 4. 15. 20. 35. 41. 50. 51. 59. 62.

The other slokas are in the following metres, in which all four *pada* are identical.

	Slokas.
Sarddula Vikriditam | – – – | ᴗ ᴗ | ᴗ – ᴗ | ᴗᴗ – | – – ᴗ | – – ᴗ | – |	2. 3. 6. 9. 10. 12. 17. 24. 29. 33. 36. 37. 44. 46. 49. 52. 54. 57. 63.
Malini .... | ᴗᴗᴗ | ᴗᴗᴗ | – – – | ᴗ – – | ᴗ – – |	5. 19.
Mundacranta ..... | – – – | – ᴗᴗ | ᴗᴗᴗ | – – ᴗ | – – ᴗ | – – |	8. 27. 30. 45.
Rathoddhuta .... | – ᴗ – | ᴗᴗᴗ | – ᴗ – | ᴗ – |	14. 18. 22. 31
Vasantatilakam ..... | – – ᴗ | – ᴗᴗ | ᴗ – ᴗ | ᴗ – ᴗ | – – |	16. 55. 34. 56.
Srugdhara ..... | – – – | – ᴗ – | – ᴗᴗ | ᴗᴗᴗ | ᴗ – – | ᴗ – – |	23. 38. 60.
Vansasthavilam.. .... | ᴗ – ᴗ | – – ᴗ | ᴗ – ᴗ | – ᴗ – |	26. 40.
Hurini..... | ᴗᴗᴗ | ᴗᴗ – | – – – | – ᴗ – | ᴗᴗ – | ᴗ – |	47.
Sikhurini..... | ᴗ – – | – – | ᴗᴗᴗ | ᴗᴗ – | – ᴗᴗ | ᴗ – |	58.
Anush-tup.—This is a very common measure. Each Pada consists of four dissyllabic feet: the third foot must be an Iambic, and the first syllable of the last foot is alternately long and short. The syllables of the remaining feet may be either long or short.	7. 13. 21. 25. 28. 32. 36. 42. 43. 48. 53. 61.

ART. II.—*Account of a Journey to Beylah, and Memoir on the Province of Lus. By Lieut.* CARLOSS, *Indian Navy.*

On the 10th of January, having received an answer to a letter I had written to the chief of Lus, announcing my arrival at Soonmemy with a letter and some presents from the Bombay Government, I commenced my journey to Beylah. Two chiefs with a small party of followers had been sent to accompany me to the capital, but as they were not ready to proceed, and I did not wish to delay my journey, I started, accompanied by Dr. Hardy, without them.

The road for some distance led over a confused mass of low hillocks covered with loose sand, or across the low swampy hollows between them, and the country had every where a most barren and desolate appearance, there not being a tree or a bush to be seen. About five miles from Soonmemy we arrived at a ridge of sand hills, about 150 feet high, from the summit of which the Poorally river was visible to the W. N. W., with an extensive tract of thick mangrove jungle stretching along the left bank; at this place we halted for a short time

until the chiefs who were to accompany us made their appearance, and then continued our journey across a low flat plain, covered with saline bushes. About an hour after sunset having reached a spot where the land was higher, and water procurable, halted for the night. In the course of the evening many travellers had collected at this spot, and by the time we arrived forty or fifty had encamped about the wells, which are merely small holes dug at the foot of a high bank, yielding a scanty supply of brackish water. There was a Syud amongst them, a noted story-teller, who continued to entertain a large audience with his tales until the night was far advanced, and as he possessed a deep and melodious voice, the effect of the kind of recitative style in which they were chaunted was extremelypleasing.

On the following morning started for Layaree, a small town six miles distant, which we reached early in the afternoon. The level plain between the sand hills and Layaree is scored throughout with marks made by the passage of water, and overrun with saline bushes, intermixed here and there with patches of stunted tamarisk trees. Our attendants told us that the Poorally flows through this plain during the inundation, and pointed out the beds of two deep water courses through which the water escapes in the latter part of the season. The river, they said, had no decided bed from Layaree, where there is a bund thrown across it, to its mouth, a distance of about twelve miles, but discharges itself into the bay and harbour of Soonmemy by several outlets, through the low grounds near the sea coast.

Layaree is a small town, containing about fifty mud built houses, prettily situated in a grove of large baubool trees; there is a large tank near it filled by a canal from the river, and half a mile to the N. E. is seen the small village of Charro, which is the residence of the darogah, or collector of taxes. At least a third of the population is composed of African slaves, who perform all the out-door labor. In my walks about the place I met several who complained bitterly of the treatment they received, and earnestly begged me to receive them on board the vessel, for they had determined to escape from their masters on the first opportunity. In the immediate vicinity of the town the country is open, and the ground laid out in fields, in which wheat, jowaree, cotton, and oil seed are cultivated. Farther off the land is overrun with high thick jungle, but in the small open spaces that occur here and there, is covered with grass, which although of a coarse kind, affords excellent pasturage for the flocks and herds.

Shortly after our arrival at Layaree, and before the baggage camels had come up, word was brought that a chief had just arrived from Beylah with Teeruthdass, the Jam's dewan, and wished to see me. As soon as a place had been prepared to receive them, by spreading

mats and carpets under the shade of a large tree, he came attended by a few armed followers, and delivered a complimentary message from the Jam, expressing his satisfaction at my visit. The chief was a little old man, with a strongly marked Arab countenance.

In the course of the conversation that ensued, I found they wanted me to remain at Layaree until they received further instructions from Beylah respecting my journey; but as this would have delayed me many days, I told them decidedly I should take it ill, if any objections were made to my proceeding immediately, and that on the following morning I should either continue my journey, or return to the ship. This seemed to puzzle them extremely, and they at last begged I would stop only one day, when they would be ready to accompany me, to which I agreed. In the course of the evening one of their attendants brought a quantity of rice flour, ghee, &c. for the use of the party.

13*th*. On sending to the chief to tell him I was ready to proceed, he said he should be detained a short time at Layaree to settle a dispute that had occurred there, and would join me at the next stage. At 10 started. For about three miles passed through cultivated grounds in which nothing but the oil seed plant was apparent, and then turning to the N. E. pursued a track leading along the bank of a deep dry nullah, running through thick tamarisk jungle: it extended several miles, and the trees were every where leafless and withered, with the exception of the small patches of undergrowth springing from their roots. As soon as we had got clear of the jungle we came upon an extensive tract of cultivated ground, watered by canals from the river, and dotted here and there with huts; at this place, where we halted for half an hour, the soil being good yields abundant crops of oil seed and cotton, and game is plentiful.

On resuming our journey, crossed a level plain thinly overspread with withered saline bushes, and extending as far as the eye could reach, apparently to the foot of the mountains on either side. We traversed it for a distance of eight miles, and after passing through an open jungle of tamarisk and mimosa trees, about five miles beyond it reached the Poorally river, and halted for the night. The distance from Layaree to this place is about eighteen miles. Here the Poorally is about 400 yards broad, and flows from east to west, which is a proof that we must have crossed its course before we arrived at Layaree, as our attendants asserted; the banks on both sides rise perpendicularly to a height of fourteen or fifteen feet, and a stream of water twenty yards broad and two feet deep pursues a winding course through the centre of its bed.

The morning of the fourteenth was extremely cold, the thermometer having fallen to 35° at day light. During the night the camels

had strayed some distance into the jungle, and the drivers being unwilling to go after them in the cold, became sulky and intractable when ordered to do so. This brought on a quarrel between them and one of the chiefs who attended us, which did not terminate until he drew his sword, and threatened to slay them on the spot if they did not immediately bring them in; frightened at his meances, they departed in haste to look for their beasts, but so much time elapsed before they could be found, that we were not ready to start until near noon.

Having proceeded four or five miles across a level plain, thickly covered with low salt bushes, we came again upon the river, which at this place is joined by the Rahto, a stream of some magnitude, flowing from the mountains to the eastward; at the point of junction the bed of the Poorally is nearly a mile wide, and when full must form a fine sheet of water. The greater part of it is overrun with jungle, and the water meanders through it in two streams, about fifteen yards wide and as many inches deep. The soil is covered in many places with a thin saline incrustation, which from the taste appears to be natron. Two alligators were lying asleep on the bank a short distance from the place where we crossed.

On the opposite side of the river we met a fine-looking young man, mounted on a camel and attended by a few soldiers, who civilly stopped to salute us. He was a son of Arab Oosmanany, the chief of the Arab Gudoor tribe, and when he had been told that we did not understand the language, endeavoured to find out from the interpreter the object of my visit to Lus.

Late in the afternoon we reached Oot, two small villages about five miles from Beylah. During this day's journey the road gradually inclined toward the western range of mountains, and we had passed through a level country, alternately overrun with saline bushes or thick jungle. We were now not far from the head of the valley, which is encircled by high mountains, and numerous thin columns of sand were visible in every direction, caused by the eddying currents of wind sweeping out of their recesses. They moved over the plain with great rapidity, and whenever one came near us, I could hear the chief who guided my camel mutter to himself, "Pass away from the road good demon, and do us no harm; I am only going to Beylah with the English gentlemen who have brought presents for the Jam." Amused with this odd request, I asked him the meaning of it, when he told me with great gravity that we were now in the territory belonging to the ancient city Shuhr Roghun, once the favorite residence of the fairy Baddul Jamaut, and that these columns were demons who had since taken possession of it, to whom it was necessary to speak sweetly to prevent them from playing us any tricks.

Oot consists of two small villages belonging to Arab Oosmanany, the chief of the Arab Gudoor tribe, one containing about 50 and the other 25 houses. The baggage not having come up, the carpets were spread under the shade of a large tree, and we were quickly surrounded by the whole population, to whom our dress and appearance seemed to afford considerable amusement. Arab Oosmanany, the chief, was at the village waiting to conduct us to Beylah; and being informed of our arrival came to pay us a visit, the whole of the villagers having been previously summoned to compose his retinue. In the course of conversation, I told him that amongst the presents there was one for him, which he begged might be delivered in the presence of the Jam. In the evening he sent us a sheep, with a quantity of flour, rice, ghee, &c., and requested we would let him know if we wanted any thing else.

At noon next day the Kossid who had been dispatched to Beylah the night before, to announce our approach, having returned, we left Oot accompanied by Arab Oosmanany and a small party of military followers. For the whole distance the road passed through a succession of cultivated ground, interspersed with small thickets composed of a high bushy tree which appears something like the willow. As we left Oot we met ten or twelve hideous looking beings dressed as women, and mounted on donkeys, who saluted us as they passed; from their peculiarly disgusting appearance and bold manners, I was induced to inquire of my companion who they were: he laughed, and said they were eunuchs. Descending by a deep irregular water course into the dry bed of a river flowing from the N. E. and about 700 yards broad, we crossed it and entered Beylah. On approaching the town the housetops were seen literally covered, and the streets thronged with people: as we entered it the crowd set up a wild shout, shricking and hallooing with all their might, and created such a dust that I was almost suffocated. The ladies also favoured us with a shrill scream, but whether of welcome, admiration, or disgust, I could not exactly make out. The young Jam, we were told, was amongst the spectators. Arab Oosmanany turned off to the palace to report our arrival, and we were conducted to a house which had been prepared for our reception; it was a most wretched dwelling, but with the exception of the palace, as good as any other in the town. The people crowded into the outer room without ceremony, and although the Jam had sent six soldiers to keep them out, they found it impossible to do so, and I was at last obliged to turn every one out myself and fasten the door: whenever it was opened a general rush was made, and some hard fighting took place between the guard and the mob before the latter could be driven back. Some of the principal inhabitants confiding in their rank, rudely walked into

the inner apartment where we were sitting, but they were soon made sensible of their mistake by being immediately turned out of the house, and told that whoever wished to see us, must first ask and obtain permission.

About two hours after our arrival one of the chiefs brought a complimentary message from the Jam, but the real object of his visit it appeared was to ascertain precisely my rank, which having done, he departed ; shortly after Arab Oosmanany came alone, and informed me that the Jam would give me a public audience next day.

Late in the afternoon a chief came to conduct us to the house where the Jam was waiting to receive us, but no horses having been sent I requested him to go back and get three, which in a few minutes made their appearance. Preceded by the presents, and attended by a party of soldiers, we proceeded through the town, and after having passed with some difficulty through several narrow streets, filled with a crowd of people, shouting as if they were mad, alighted at the door of the Kutchery, which, from the dense mass collected round it, was hardly approachable ; on entering the court-yard we were received by one of the chiefs, who taking me by the hand led me towards a covered veranda, or room open in front, where the Jam was seated in state ; although the hall of audience was merely a rude mud building, without ornament or furniture of any kind, the coup d' œl was rather imposing, the group drawn up inside being arranged so as to produce the best possible effect. In the centre sat the young chief, on a square platform raised about a foot high, and covered with a carpet and cushions of silk richly embroidered. His relations and chiefs were disposed on either side according to their rank, Ularacky, his chief confidential adviser being seated on his right hand a little in advance, and his tutor, the Hadgi Hafiz, on his left, and the back ground was filled up by a body of well dressed, fine looking military retainers. My conductor having led me up to the musnud, the Jam desired me to sit down on a carpet laid in front of it, and the usual complimentary speeches and inquiries were made by the minister Ularacky, who conducted the whole business. During the time the interview lasted, the young chief, who I imagine had been well tutored for the occasion, sat without uttering a word, with a vacant incurious expression of countenance which was no doubt assumed. He is a handsome lad, of thirteen or fourteen years of age, with fine expressive eyes, rather fair complexion, and a profusion of long jet black ringlets falling on each side his face. At present his countenance is rather feminine, and when we saw him in his state robes, which from their peculiar fashion aided the resemblance, he appeared more like a young Indian queen

than the chief of a wild tribe of Noomrees. He wore an under dress of crimson and gold kincaub, with trowsers of striped silk, and over this a mantle of pale blue satin richly embroidered with gold and silver thread, colored silk, &c., in the pattern peculiar to the Cashmere shawls. His turban formed of splendid kincaub was extremely large, and adorned with a feather of open gold work, set with emeralds, sapphires, rubies, &c. and another ornament richly set with jewels, similar to what I believe is called in Europe a sevigni, from which hung several strings of large pearls. A gold-hilted sword, with a shield ornamented with chased gold knobs lay before him, and completed his equipment. After the presents had been exhibited, which appeared to excite the admiration of all present, I took leave, and attended as before by a party of soldiers, amongst whom I distributed a few rupees, as is customary on these occasions, returned to the house.

During the week I remained at Beylah I had several long conversations with Ularacky, the Jam's minister. Ularacky is the second chief of the Jamootry, the particular tribe to which the Jam belongs, and has been chosen by the Jam's mother in consequence to conduct the government of the province under her superintendence; he is a fine intelligent old man, without any of the prejudices against Europeans which generally exist in the minds of those natives of India who have had no intercourse with them; but being surrounded by chiefs belonging to the other tribes, who are jealous of his influence with the reigning family, he is obliged to act with the greatest caution.

Beylah contains about 800 houses constructed of sticks and mud, and between four and five thousand inhabitants; it covers a small piece of elevated ground rising above the banks of a river of some size, flowing from the N. E. which joins the Poorally about a mile farther to the westward, and with the exception of the N. E. quarter, which is surrounded by a ruinous mud wall, is entirely undefended. The palace of the Jam is within the walls, and is the only brick building in the place. About Beylah a large portion of the land is under cultivation; and the face of the country presents a pleasing succession of grassy plains and small woods, which with the advantage of being placed nearly at the junction of two rivers, and at an equal distance from the mountains on either side, renders it the best spot in the province that could have been selected for the site of the capital. The Poorally passes about a mile to the westward of it, and spreading over a large extent of surface forms several swamps, which are fed by numerous springs; in some of them rice is cultivated, and the ground about their banks is every where much broken by deep gullies worn by the water flowing into them in the rainy season.

Ularacky having communicated to me the decision of the durbar respecting the survey of Soonmemy, and finding the Jam's answer to the Government letter would not be ready for two days, I determined to employ the interval in visiting Shuhr Roghan, an ancient excavated city, situated amongst the mountains to the northward; on stating my wish to Ularacky, he at last obtained the requisite permission from the Jam's mother; who as a compliment, sent one of her confidential attendants with her son's state-matchlock to accompany me.

Beyond the town the road for some distance wound through a thick wood occupying the bed of a deserted river; here and there it opened out into small but picturesque glades, but in general the underwood was so dense, that we had some difficulty in making our way through it: the bushes were full of birds, amongst which I noticed several parrots, and a very pretty little bird with green and golden plumage: it was decidedly the most beautiful spot I had seen in the province. On ascending from the bed of the river we came upon an open plain thickly covered with large rounded stones, and cut up in every direction by deep water courses, and about four miles from the town crossed the dry bed of a river about 500 yards wide; a short distance beyond it is situated the small village of Momadary surrounded by fields, and to the eastward a grove of lofty trees was visible, where my attendants said the Jam had a large garden. From Momadary to the head of the valley the stony plain is thinly dotted with bushes, and every where deeply furrowed by channels; this part of the valley rises slightly to the foot of the hills, and from its appearance, must have water flowing over its surface in the rainy season, towards the Poorally, from one range of mountains to the other.

About nine miles to the northward of Beylah, a range of low hills sweeps in a semicircle from one side of the valley to the other, and forms its head. The Poorally river issues from a deep ravine on the western side, and is about 200 yards broad; it is bounded on one side by steep cliffs, forty or fifty feet high, on the summit of which there is an ancient burying ground, and the water runs bubbling along it in two or three small rivulets, amongst heaps of stones and patches of tamarisk jungle. Having crossed the stream we pursued our way up its bed amongst the bushes, until we gained the narrow ravine through which it flows, and then turning into one of the lateral branches entered Shuhr Roghan. The scene was singular; on either side of a wild broken ravine the rocks rise perpendicularly to the height of four or five hundred feet, and are excavated as far as can be seen; in some places where there is footing to ascend, up to the summit; these excavations are most numerous along the lower part of the hills, and

form distinct houses, most of which are uninjured by time; they consist in general of a room fifteen feet square, forming a kind of open veranda, with an interior chamber of the same dimensions, to which you gain admittance by a door; there are niches for lamps in many, and a place built up and covered in, apparently intended to hold grain. Most of them had once been plastered with clay, and in a few, when the form of the rock allowed of its being done, the interior apartment is lighted by small windows. The houses at the summit of the cliffs are now inaccessible, from the narrow precipitous paths by which they were approached having been worn away; and those at the base appear to have been occupied by the poorer class of inhabitants, for many of them are merely irregular shaped holes, with a rudely constructed door. The rock in which these excavations have been made, is what I believe is called by geologists Conglomerate, being composed of a mass of rounded stones of almost every variety of rock, embedded in hard clay; it contains a large quantity of salt (I think natron), which is seen in a thin film on the walls of all the chambers, and at two or three spots in the upper part of the ravine, where water drops from the overhanging crags.

It would be singular if such a place as Shuhr Roghan existed amongst a people so superstitious as the Noomrees without a legend of some kind being attached to it, and they accordingly relate the following story: In the reign of Solomon the excavated city was governed by a king celebrated all over the East for his wisdom, and the great beauty of his only daughter Buddul Tumaul; she was beloved by seven young men, who from the great friendship existing among them, were called by way of distinction "the seven friends," but they perished one after the other in defending the object of their adoration from the designs of half a dozen demons, who, attracted by her surpassing beauty, made repeated attempts to carry her off. At this interesting period of her history Syful Mullik, son of the king of Egypt, arrived at Shuhr Roghan, who being the handsomest man of his time, and as brave as he was handsome, had been dispatched by his father on his travels, in the hope that by the way he might conquer a few kingdoms for himself. The princess, as a matter of course, fell in love with him; the demon lovers were in despair, and made a desperate effort to carry her off when at her devotions, but were all slain in the attempt by the prince. The father of the fair princess rewarded him for his gallantry with the hand of his daughter, and the happy couple lived to reign for many years in peace and security over the excavated city. Such was the tale related to me by my attendants, which forms the groundwork of a story written in the Persian

language, entitled, "The Adventures of Syful Mullik with the Fairy Buddul Tumaul." I obtained a copy of the work at Kurachee.

A short distance above the entrance of the city, the broken precipitous ravine in which it is situated decreases in width to ten or twelve yards, and forms a deep natural channel in the rock. For about half a mile the cliffs are excavated on both sides to a considerable height, and taking the remains of houses into account, I think there cannot be less altogether than 1500. In one place a row of seven, in very good preservation, was pointed out by the guides as the residence of "the seven friends," and further on we came to the grandest of all, the palace of Buddul Tumaul. At this part, the hill, by the abrupt turning of the ravine, juts out in a narrow point, and towards the extremity forms a natural wall of rock about 300 feet high, and twenty feet thick; half way up it had been cut through, and a chamber constructed, about twenty feet square, with the two opposite sides open; it is entered by a passage leading through a mass of rock partly overhanging the ravine, and on the other side of the apartment two doors give admittance to two spacious rooms; the whole had once been plastered over, and from its situation must have formed a safe, commodious retreat. At the summit of the hill near it there is another building, which my attendants said was the mosque where the princess was rescued by Syful Mullik, when the demons attempted to carry her off. Having seen every thing worthy of notice in this troglodytic city, we quitted it, and returned to Beylah.

On the 21st the letter and presents for Government having been delivered to me by Ularacky, I left Beylah late in the afternoon, and on the evening of the 24th arrived at Soonmemy. On the road we met a party of fakeers proceeding to Hinglaj: they presented a most grotesque appearance, their faces besmeared with paint, and their ragged garments decorated with tufts of feathers, and a variety of irregular ornaments. Their *agwa*, or chief, who was a portly, well-dressed personage, marched at their head, and carried a long white wand as the badge of his office. These poor wretches had collected from all parts of India, and as we approached them they set up a loud shout, exclaiming "Hurrah for the holy saint of Hinglaj—we are going to visit our good grandmother—praises to *Kalee*, the holy goddess! hurrah, hurrah."

Hinglaj, the shrine to which they were proceeding, is situated about a day's journey from the sea-coast, at the extremity of the range of mountains dividing Lus from Mukran, and is said to be of great antiquity. The temple is merely a small building erected on one of the mountain peaks, and is held in great veneration by both

Hindoos and Mussulmen. It is dedicated to *Kalee*, the goddess of fate, and there is a large circular tank or well near it, which the natives say has been sounded to a very great depth, without bottom having been obtained; they relate that one of the priests employed himself for a whole year in twisting a rope for the purpose, but it was not long enough. Those who can swim, jump into the tank from an overhanging rock, and proceed through a subterranean passage to another part of the mountain, which is believed to purify them from their sins. There is also a species of divination practised by throwing a cocoanut forcibly into the water, and according as the bubbles rise in a larger or less quantity, the individual will be happy or miserable. This account of the place, which is celebrated all over India, was furnished by people who had been there several times.

Memoir on the Province of Lus.

The small province of Lus is about 100 miles long by 80 broad, and is bounded to the south by the sea, to the north by the Jahlawan hills, and to the east and west by ranges of high mountains, which descend from the great mass occupying Beloochistan, and separate it from Sinde and Mukran. Besides these, which terminate on the sea-coast (one at Rus Mooaree, and the other 100 miles further to the westward, near Rus Arubah) there is another spur sent off from the Jahlawan hills, called Jebbal Hahro, which runs down the centre of the province nearly to the coast, and divides it into two unequal portions. These three ranges are all of the same formation, principally coarse sandstone, and of the same average altitude, each being about 3000 feet high.

The climate of Lus is subject to considerable variation; in the winter season it is delightful, the atmosphere being clear, dry, and cool, but in the summer months it is as disagreeable from the excessive heat. During my journey to Beylah, in the month of January, the thermometer stood at 35° for three mornings running, and it did not rise higher than 67° even in the hottest part of the day. Situated just without the limits of the south west monsoon, and nearly encircled by high mountains, which not only reflect the sun's rays, but exclude the wind, the heat in the summer season is intense; and although the atmosphere is occasionally cooled by refreshing showers, it is severely felt by the inhabitants.

The western division of the province, lying between the Hahro and Hinglaj mountains, is the smallest and least productive of the two.

The greater part is occupied by a mass of barren hills, with small valleys between them; and the remainder forms a level sandy district near the sea, which in most places is barren and almost destitute of inhabitants.

The eastern division of the province is watered by the Poorally and its numerous tributaries, and the only productive part of it is the valley or plain through which that river takes its course. From the sea to the Jahlawan hills it measures about sixty-five miles in length, and in width decreases gradually from thirty-five miles; its breadth on the coast as you approach its upper extremity, where it terminates in a semicircle of hills, is eight or nine miles across. With the exception of a belt of low broken hillocks on the sea coast, about eight miles broad, the whole face of the valley is perfectly flat, and it is to this circumstance the province owes its name of *Lus*, and which in the language of the country signifies a level plain. On looking down it from the upper extremity, where the ground rises slightly at the foot of the hills, the horizon appears of a misty blue color, and is as level and well defined as it is at sea: the only elevated spot I saw, was the rising ground on which Beylah is built, and that is not more than ten or twelve feet high. There is a tradition amongst the natives, that at a remote period the valley was an inlet of the sea, and from its extreme flatness, alluvial formation, and small elevation above the level of the ocean, there is reason for believing it was once the case.

The soil is every where alluvial, and is composed of a light loose clay mixed in a greater or less proportion with fine sand; in some places it preserves a hard smooth surface, and contains a portion of saline ingredients, but in others crumbles into fine dust, which is blown in clouds by the lightest breeze, and renders travelling very disagreeable; it is also in many parts encumbered with large rounded stones, and at the head of the valley above Beylah, where there are numerous streams and water courses, they are so thickly strewed over the surface, that the whole plain, from one range of hills to the other, appears like the bed of a large river. Near the coast there is scarcely a tree or a bush to be seen, and the country has a most barren and desolate aspect. A confused mass of undulating hillocks, 80 or 100 feet high, covered to some depth with loose sand and thinly overrun with creeping plants, extends about eight miles inland, and in the small hollows and plains between them, which are so low as to become saturated at high tide by the sea, the land produces nothing but saline shrubs or coarse reeds. Beyond the sand hills the level plains commence, and small patches of stunted tamarisk trees appear here and there; but as you approach Layaree they attain a greater height, and the jungle becomes dense.

From that village to Beylah the face of the country every where presents the same appearance in its general features, and in the vicinity of the different streams a large portion of the land is under cultivation; but beyond these spots it is either covered with saline bushes or thick tamarisk jungle, and from the poverty of the soil would not yield sufficient to repay the cultivator for his toil in clearing it. In some of the jungles the baubool (*mimosa*) is abundant, and in others the trees are withered and leafless for miles, and there is no sign of vegetation, save in the undergrowth beneath them. About and above Beylah the tamarisk and baubool almost entirely disappear, and are succeeded by a tree which from a short distance appears like a species of willow, and is so high and bushy, that at those places where it abounds it forms thick and extensive woods; game is every where plentiful, but particularly so on the eastern side of the valley; herds of antelopes and spotted deer are frequently seen in the open country, and the wild hog is sometimes found in the thickets; the jungles are full of hares and partridges, and the lakes and swamps swarm with water fowl of every description.

On the banks of the Poorally and its tributary streams a large portion of the land is under cultivation; and this is also the case along the eastern side of the valley, where there are several small lakes left by the waters of the inundation: at these spots the soil is a rich mould, and yields abundant crops of wheat, jowaree, oil seed, cotton, and esculent vegetables. In the dry season most of the fields are irrigated by cuts from the rivers, but some depend entirely upon the rains for a supply of water;—on the former a tax is levied of one-third, and on the latter of one-fifth of the produce.

The principal river of Lus is the Poorally, which rises to the northward amongst the Jahlawan mountains, and issues upon the valley through a deep ravine about nine miles to the N. W. of Beylah; on leaving the hills it flows in several rivulets along a bed 300 yards wide, but near Beylah it increases to nearly a mile in breadth, and the water spreading over a large extent of ground forms a succession of swamps; amongst these there are many small springs, and part of the land is turned to account in the cultivation of rice. Above Beylah the plain up to the foot of the hills is every where deeply scored with the beds of rivulets and water courses, but they are only filled during the inundation months, and then empty themselves into the Poorally. The first tributary stream of any size flows from the mountains to the N. E., and passing close along the elevated ground on which the capital is built, joins the river below the swamps; opposite the town it is 700 yards broad, and when I crossed

it in the month of January its bed was perfectly dry. From the junction of this stream the river pursues a winding course to the southward, and has an average breadth of 400 yards; at some places however it is much wider, especially at the confluence of the Khato, a large stream descending from the eastern range of mountains, where it is nearly a mile across, and when full, must form a fine sheet of water: here its bed is overrun with jungle, and the stream winds through the centre in two small rivulets, 15 yards broad, and 15 inches deep. The Khato is from three to five hundred yards broad, and is only filled in the rains. Four miles to the N. E. of Layaree the Poorally receives the water of the Hubbe, a river of some size flowing from the eastward, and below the point of junction is confined by a dam or bund, to retain its waters in the dry season for agricultural purposes. From this spot to its mouth *it has no bed;* as the river fills during the rains the bund is swept away, and the water escapes through a level plain covered with bushes, about five miles broad, which it inundates to a depth of two or three feet. This plain is bounded by the sand hills on the coast, and extends in a winding direction to the mouth of the river, which is situated at the head of the harbour of Soonmemy, and only runs four or five miles into the land. The water also finds another outlet through a line of lakes and swamps on the eastern side of the valley, where the ground is very low, and reaches the sea at a large lagoon on the shores of the bay, a few miles below the harbor. Serundo, the largest of the swamps, is several miles in length and very irregular in shape; its width in some places exceeding a mile, and at others contracting to four or five hundred yards. In the dry season, when it has a depth of four or five feet, the water is salt and charged with vegetable matter from the thick mangrove jungle growing along its banks, but during the inundation it is perfectly fresh, and the swamp then assumes the appearance of an extensive lake. Water fowl of all kinds resort to it in incredible numbers, and alligators are almost equally abundant.

The water of the Poorally holds in solution a large quantity of saline ingredients, and every stone in its bed that is at all exposed to the influence of the sun is covered with a thin incrustation. As far as I could judge from the taste it is natron, and the flavor of the water is scarcely affected by it. In the swampy parts of the river near Beylah alligators are numerous, and they are met with here and there throughout its course.

In the whole province there are not more than ten or twelve towns or villages, and the largest of these, Beylah, does not contain more than 5,000 inhabitants; Soonmemy has not half that number, and

Ootul, a town situated on the eastern side of the valley, which ranks next in importance, scarcely a fourth; Layaree, Oot, Momadary, and the others, are small villages of thirty or forty houses each, part built of mud, and the rest of mats, and none have more than 150 or 200 inhabitants. The people generally are scattered over the face of the country, and have no fixed habitations; their huts are erected wherever there is pasturage for their cattle, and being constructed of stakes and reed mats, are easily removed to other spots when the supply of fodder is exhausted. Beylah, the capital, is built upon a rising ground, on the north bank of a small river flowing from the mountains to the north-east, which joins the Poorally about a mile to the westward of the city. It contains about 800 houses built of mud, and a population of about 5000 souls. The palace of the Jam is situated in the north-east quarter, and this part of it is surrounded by a mud wall of no great strength, which is the only defence of the place.

The productions of Lus, are grain, (chiefly wheat, and jowaree) oil seed, a kind of gram called gogur, and cotton; ghee is made in large quantities, and sent to Kurachee or Soonmemy for exportation, and the flocks furnish a small supply of wool:—cotton cloth, with the coarse woollen dresses worn by the peasantry, and coarse carpets made at Beylah, are the only articles manufactured in the country.

It is difficult to form an estimate of the amount of the population, from the people being so much scattered over the face of the country, but I do not think it exceeds 25,000 souls. It is composed principally of Noomrees, descendants from the ancient Summa and Soonvia Rajpoots, whose chiefs formerly ruled in Sinde, and who are divided into seven tribes—the Jamootry, Arab Gudoor, Shooroo, Boorah, Shukh, Warah, and Mungayah. The Arab Gudoor is said to be a branch from the celebrated Arab tribe the Koreish, and to have settled in Lus in the reign of the third caliph Omar. That the family of Arab Oosmanany, the chief, is from an Arab stock is evident, for in him and all his relatives the Arab form and features are strongly marked, but the resemblance is not visible in the tribe generally, and it is no doubt of Noomree origin. The Jokeeas, and Jukreeas, who are also Noomrees, and inhabit the mountainous country to the eastward, were also formerly subject to the chief of Lus; but when Kurachee was taken by the Scindians they threw off their allegiance, and have ever since acknowledged the authority of the Ameers. Besides Noomrees there are also many Hindoos, and a large number of African slaves: the latter perform all the work. The chiefs and a few of their military followers are robust, and good looking men, but the Noomrees generally possess few of those qualities, either physical or moral, which would entitle them to

be considered a fine race. Amongst the lower orders mixture of the different castes and tribes is observable, and a large number exhibit marks in their features of their African descent. In appearance and bodily strength the men are inferior to the inhabitants of most Asiatic countries, and they are ignorant, indolent, and superstitious. The women possess few personal charms even when young, and are remarkable for their bold and licentious manners. The dress of both sexes is much the same as it is in Sinde, and there is in fact a marked resemblance, both in character and appearance, between the people of the two countries.

Jam Meer Mahomed, the chief of Lus, is about fourteen years of age, and does not at present take any part in the government of the province, which is conducted by Ularacky, the chief of the Jamootry, under the direction of his mother. Jam Deenah, his cousin, is the only male relative he has; he is about forty years of age, and much liked by the people for the kindness and generosity of his disposition. The Jam's sister was married some years ago to Meer Sobdar, one of the Sinde Ameers, and it is settled that when he is of age he is to espouse one of that prince's sisters in return. He has also a half sister in the harem of Meerab Khan, the Kelat prince, and another married to the chief of the Jokeeas. The mother of these two girls resides at Soonmemy and is in such a destitute condition that she has lately been obliged to sell her clothes and jewels to obtain the necessaries of life.

The Jam is not independent, but like all the Brahooey chiefs, holds his dominions under the feudatory tenure of furnishing a certain number of troops when required for the service of his lord paramount, the sovereign of Kelat. The Jam's father was formerly obliged to send him a portion of the duties collected in his territories as a yearly tribute, but after his marriage with one of the prince's daughters, this was no longer demanded. At present the Jam is kept in complete subjection, for his small state is every where exposed to the attacks of the Brahooey tribes, who if commanded by the Kelat chief would quickly overrun it; and he would not in consequence dare to disobey any order from that prince, or act in any business of importance without his sanction. The number of troops he is expected to bring into the field in time of war was fixed at 4500; but at present the whole military force of the province does not exceed 2700 men, which are furnished by the different tribes in the following proportion:

Jamootry, ...	600
Arab Gudoor, ...	600
Shooroo, ...	200
Boorah, ...	300
Shukh, ...	100
Warah, ...	100
Mungayah, ...	300
Brahooeys, ...	500
Total, ..	2,700

Since the death of the Jam's father, who expired about eight years ago, the revenues of the province have decreased considerably, and do not now amount to more than 35,000 Rupees annually. They are derived from a duty of three per cent. levied on all imports and exports, and a bazar toll of one per cent. collected at the towns they have to pass through on the road to Beylah. There is also a land tax of one-third the produce on all grounds irrigated from the rivers, and one-fifth on those which depend solely upon the rain for a supply of water. Last year the revenue collected at the different towns was as follows:

At Soonmemy, ... Rupees,	12,000
At Layaree, ...	2,000
At Ootul, ...	3,000
At Beylah, ...	9,000
At Oomarah, ...	1,000
Land tax, ...	8,000
Total, ..	35,000

Soonmemy is the principal sea-port of Lus, and for such a miserable looking place possesses considerable trade. The town generally called Meany by the natives is mean and dirty, and does not contain more than 500 houses; they are built of sticks and mud, and have a small turret rising above the roof open to the sea breeze, without which they would scarcely be habitable in the summer months, on account of the excessive heat; formerly the town was surrounded by a mud wall, but as no pains were taken to keep it in repair it gradually fell to decay, and now scarcely a vestige of it remains. It contains a population of about 2,000 souls, most of whom are employed in fishing, and are extremely poor, and there are besides a few Hindoos who have the whole trade of the place in their hands. At Meany the water is extremely bad. I examined all the wells in the neighbourhood, and caused others to be dug in the most promising spots, but it was so brackish that it was not drinkable, and I was obliged to send to

Kurachee for a supply for the vessels. The harbour, which has been formed by the Poorally river, is a large irregular inlet spreading out like that at Kurachee in extensive swamps, and choked with shoals; the channel leading into it is extremely narrow, and has a depth of sixteen or seventeen feet at high water in the shallowest part, but it shifts its position every year, and vessels of any size could not navigate it without great difficulty, until it had been buoyed off inside. There is six or seven and even ten fathoms in some places, but towards the town the channels become shallow, and the trading boats cannot approach it nearer than a mile; at the spot where they anchor they are always aground at low water. During the south-west monsoon the harbour cannot be entered, for the bar at the entrance is exposed to the whole force of the swell, and the breakers on it are heavy. There is another small sea-port belonging to Lus, situated on the western side of the Hinglaj mountains, at Ras Ambah, it is called Ournarah, and is the place to which the productions of the western division of the province are sent for exportation.

The total value of the trade of Lus does not exceed five lacs of rupees; the imports are—from Bombay, cloths, silks, iron, tin, steel, copper, pepper, sugar, and spices; the Persian Gulf, dates and slaves; and from Sinde, a small quantity of coarse cotton cloth. The greater part of the articles brought from Bombay are sent to Kelat, for although highly prized in Lus the people are too poor to purchase them, and they receive in return wool, of which 800 candys arrived in the course of last year, and different kinds of dried fruits. The exports, are—grain (principally wheat and jowaree) ghee, wool, oil seed, and a quantity of gum; a duty of three per cent. is levied on all imports and exports, which may be paid either at Soonmemy or Beylah, and a bazar toll of one per cent. at Layaree and Ootul, two towns on the road.

Most of the articles imported from Bombay are sent to Kelat, and from that city distributed throughout Beloochistan; the quantity is very small for the supply of such an extensive kingdom, and is not likely to become greater until the Kelat prince takes measures to prevent the caravans from being plundered in their route from Beylah to his capital. The intermediate districts are inhabited by various Brahooey tribes, such as the Mingulls, Bezinyas, &c. and to each of the chiefs, the merchant has to pay from one to four rupees for the camel load, as may be determined at the time; their followers also frequently pillage the caravans. Meerab Khan, the Kelat prince, has no doubt the power to repress these outrages, and he would certainly interfere to prevent them, if the advantages that would accrue to

himself from the increase of the trade, were pointed out in a favorable manner. All the merchants of Lus are of opinion, that the commerce would be considerably enlarged if security were afforded to the trader, and of this there can be little doubt, for cloth and other articles of European manufacture are in great request throughout Beloochistan, and the supply is not at present adequate to the demand.

Formerly the commerce of Lus was much more valuable than it is at present, and a large portion was sent by the Kelat route to the northern provinces of Hindoostan; within the last forty years it has from various causes gradually declined. In 1808 Soonmemy was taken, and plundered by the Joasmy pirates, and for some years the merchants were afraid to send goods there; the port was just beginning to recover from this blow, when the Ameers of Sinde issued strict orders to the merchants of Kurachee to discontinue their practice of importing goods to any of the ports of Lus under the severest penalties, and this measure, which at once took away half the trade of the place, completed what the pirates had begun. In the meantime the trade with the northern provinces had ceased entirely, for they had become so unsettled that the Patan merchants, who are the great carriers in that part of the world, ceased to come to Kelat for goods, and as they afterwards found the route from Upper Sinde much the safest, they resorted to it in preference, and have since obtained the small supply of goods they require from the merchants of that kingdom. Before the trade of Lus had suffered from the causes above mentioned, its value is said to have been five times greater than it is at present, and it was also much more lucrative to the merchant, for at that period goods of European manufacture sold for double the price that is now obtained for them.

T. G. CARLOSS,
Lieutenant, Indian Navy.

1st February, 1838.

ART. III.—*On three new species of Musk* (Moschus) *inhabiting the Hemalayan districts.*

To the Editor of the Journal, Asiatic Society.

SIR,—Several years ago I called the attention of Dr. Abel to some remarkable, and apparently permanent distinctions of colour characterising the Musks, or Musk Deer of the Cis-and Trans-Hemalayan regions. These I subsequently inserted in my amended catalogue of *Mammalia*, under the specific names of *Leucogaster*, *Chrysogaster*, and *Saturatus*, but without giving specific characters, owing to my conti-

nued inability to establish the species upon a more solid basis than that of distinction of colour. The partial investigations which I have been enabled to make, strongly favour, however, the supposition that the superficial diagnostics are supported by others of more importance in the form of the crania, and in the structure and position of the musk pod. And, though I am still unable distinctly to expound these latter differences, I think it may stimulate curiosity to indicate summarily the three presumed species as marked by their diversities of colour, in the hope that attention may be thence drawn to the structural peculiarities which I believe to exist in the sculls, and in the musk bags.

1st. Species, *Moschus chrysogaster, nobis.* Bright sepia brown sprinkled with golden red ; orbitar region, lining, and base of ears, whole body below, and insides of the limbs, rich golden red or orange ; a black-brown patch on the buttocks posteally ; limbs below their central flexures fulvescent.

2nd. Species, *Leucogaster, nobis.* Body above, and the limbs deeper brown sprinkled with fulvous : below the head, neck, and belly, together with the insides of the ears, and the orbits, hoary white.

3rd. Species, *Saturatus, nobis.* Throughout saturate dusky brown, somewhat paler below : chin only, and lining of the ears pale and hoary.

Drawings of the above animals were transmitted to London, through the Society, in May 1836.

I am Sir, your obedient servant,

B. H. HODGSON.

Nepal, April 15, 1839.

ART. IV.—*On Isinglass in* Polynemus sele, *Buch., a species which is very common in the Estuaries of the Ganges. By* J. McCLELLAND, *Assistant Surgeon.*

There are nine species of *Polynemi*, or Paradise fishes, enumerated by authors, and although they are all pretty well described, I am not aware of any more valuable property being known regarding them than their excellence as an article of food, of which we have a familiar instance at this season in the *Pol. paradiseus*, or Mango-fish, *Tupsi Muchi* of the Bengalese.

Buchanan has five species in his work on Gangetic Fishes, but three of these are small, and probably varieties only of the *Tupsi;* two of them however, are of great size, and so common in the estuary of the Hoogly that I have seen numerous hackeries, or bullock carts, conveying them to the Calcutta bazar, during the cold season. They are not

confined to the estuary of the Hoogly, but probably extend to all the estuaries of the Ganges, as Buchanan says they do; and we know that Dr. Russell also describes two large species in his work, long since published, on the fishes of the Madras Coast.

The very valuable production, *Isinglass*, having been recently found to be yielded by one of the fishes of the Hoogly by a writer in Parbury's Oriental Herald, it became an interesting object to determine the systematic name of the fish affording an article so valuable, and to learn as much as possible regarding its habits. Having procured a specimen of this fish from the bazar, I was surprised to find it to be a *Polynemus*, or Paradise fish, although the writer alluded to described it as resembling a Shark. My surprise was not that a person unacquainted with fishes should compare it to a Shark, or to any thing else, but that a nearly allied species to the Mango-fish should contain a natatory vessel of such size and value, while that organ is quite absent in the Mango-fish itself, though a general character of nearly all others.

I had come to the determination never to describe single or detached species of fish, but as the object of this paper is to elucidate the commercial side of a question already before the public, I shall not pretend to offer any remarks on the scientific part of the subject, which is indeed beyond my province, as my observations have hitherto been confined to the fresh water species of India.

The species affording the Isinglass is the *Polynemus sele*, Buch.; *Sele*, or *Sulea*, of the Bengalese, described, but not figured, in the Gangetic Fishes; but if Buchanan's drawings had not been placed under a bushel since 1815, probably this useful discovery would have been sooner made, and better understood by the writer in Parbury's Oriental Herald, to whom we are indebted for it.

The annexed figure from Buchanan's unpublished collection at the Botanic Garden, conveys an excellent representation, about half size, of a specimen from which I obtained 66 grains of Isinglass: but as the writer in Parbury's Oriental Herald states that from half a pound to three quarters of a pound is obtained from each fish, we may suppose either that *P.sele* attains a much greater size than 24 pounds, the limit given to it by Buchanan, or, that the Isinglass is also afforded by a far larger species, namely *Polynemus teria*, Buch. or *Teria bhangan* of the Bengalese, *Maga jellee* of Russell, which Buchanan was informed sometimes equals three hundred and twenty pounds avoirdupois, and which I frequently have seen of an uniform size, that must have been from fifty to an hundred pounds at least, loading whole cavalcades of hackeries at once on their way to the Calcutta bazar, as I have already stated, during the cold season, when they would consequently seem to be very common.

Although the sound, or natatory vessel is the part of the fish that would afford the principal inducement to form fisheries, one of the obligations that speculators should be obliged to enter into with the Government is, to cure all parts of such fishes as might be taken for their sound. Considering the scarcity of fish in many parts of India, and the great, I may say unlimited demand for it in some parts of the country even when badly preserved, as well as the excellence of the flesh of all the *Polynemi*, the curing of these fishes might prove no less profitable to the parties themselves, than it would unquestionably be to the country. I was happy to find the attention of the Royal Asiatic Society directed to the subject of curing fishes in India by Dr. Cantor, (vide Proceedings, 21st April, 1838) but a something was then wanting to be known in order to give a direct inducement to the undertaking.* I therefore regard the discovery of the *Ichthyocolla* of commerce in one of the larger *Polynemi* of India as a circumstance eminently calculated to direct attention to a promising and almost unlooked for source of enterprise. We first of all require to know whether more *Polynemi* than one afford it, and to be fully acquainted with the habits and the methods already employed for taking such as do. *Polynemus sele*, Buch. is the species I examined and found to contain it; but this species is supposed to be a variety only of *Polynemus lineatus*, which is very common on all the shores to the eastward; it therefore becomes a question of some importance to determine whether *P. lineatus* yields the same valuable article, and if it

* Should Dr. Cantor still be in London, I would recommend those who may be interested in the important question of Isinglass to consult him, as no one is so competent to afford information regarding the fish by which that article is yielded in India. He will, I am confident, on a re-examination of his notes regarding the *Polynemi*, readily distinguish those with large sounds, and be able to afford more valuable information regarding their habits, and the quantities in which they are procurable, than could be expected from any one who had not devoted his thoughts to the subject, during a survey of the place in which these fishes occur. I am not sure that the species of *Polynemus* Dr. Cantor particularly refers to in his paper as the *Salliah*, or *Saccolih*, is not the very fish that affords Isinglass; if so, it appears to be considered by Dr. Cantor as a new species, and his notes will probably afford all that it is essential to know regarding its habits. Thus, as Sir J. E. Smith somewhere observed, "the naturalist who describes a new species, however trifling it may seem, knows not what benefit that species may yet confer on mankind."

In an interesting account of Kurachee by Lieut. Carless, read at the last anniversary Meeting of the Bombay Geographical Society, cod sounds and shark's fins are mentioned among the exports from that place, and fishing is said to be carried on to a considerable extent along the coast of Sinde. As however the Cod, *Morrhua vulgaris*, Cuv., is quite unknown in the Indian Seas, the species from which the sounds alluded to by Lieut. Carless are taken are no doubt *Polynemi*, the larger species of which are sometimes called by the English, Rock-Cod. It will be curious to learn if the Chinese have monopolised this trade on the coast of Sinde as well as in the Hoogly.

be really common to the eastward; if so, it seems strange that the Chinese should send for it to the Hoogly. Next, do the *Pol. Emoi* and *Pol. plebeius*, supposed by Buchanan to correspond with his *Sele*, contain the same valuable substance? and do either of Russell's species, namely, the *Maga booshee* and *Maga jellee*, (Indian Fishes, 183, 184,) yield it? These are questions easily determined along our coasts by merely opening such fish as correspond with the one here figured, and ascertaining whether they contain an air vessel or not, and whether that vessel if present be large or small. Mergui, Batavia, Singapore, Tranquebar, Madras, and Bombay are points at which observations might be made. This question may be so easily ascertained, that it is hardly worth forming a conjecture about it; but if any of the species common to the coasts of the Eastern seas possessed so valuable a property, the chances are that it would have been long since discovered. It is therefore probable that the large gelatine sound will be found to be peculiar to *Pol. sele*, and perhaps *Pol. teria*,* Buch. both of which seem to resort chiefly to the Gangetic estuaries at certain seasons, particularly during the North-east monsoon, when it is easy to imagine that the shelter afforded in those estuaries at that season, might account for many peculiarities which their ichthyology appears to present, compared with that of open coasts. It is during the cold season that the two gigantic fishes above mentioned appear to be caught in most abundance, a circumstance the more favourable to any improved operations that might be resorted to with a view to convert them to useful purposes. Whether both contain the same valuable substance, I am unable to say, having as yet only examined *P. sele*.

GEN.—POLYNEMUS.

Two fins on the back, with long filaments attached to the sides in front of the pectoral fins. Opercula covered with scales; preoperculum serrated behind. Example. The common Mango-fish of Bengal.

YIELDING ISINGLASS.

P. Sele, Buch. Plate —

Sele, or *Sulea* of the Bengalese.

Five filaments, the first reaching from the front of the pectorals to midway between those fins and the anal, the other filaments progressively shorter; no streaks on the sides, lateral line deflected on the lower lobe of the caudal fin. The fin rays are as follows;—first dorsal seven, second dorsal fourteen, pectorals thirteen in each, ventrals each six, anal twelve or thirteen, caudal twenty (?) The teeth are very fine, continuous below round the edes of the jaws, but interrupted at the

* *P. quadrifilis*, Cuv. *P. tetradoctylus*, &c. and probably refer to the same.

anterior part of the upper jaw, behind which a small detached group of palatine teeth are placed on the vomer.

The liver consists of an elongated left lobe and a short right one, under which the gall bladder is situated. The stomach is a short muscular cul-de-sac, both orifices of which being placed at the anterior extremity, from which numerous small *cecæ* are given off, the intestine extends straight to the vent; in all these respects it corresponds nearly with *P. paradiseus*. The air vessel, which is quite absent in the latter, and on which the peculiar value of this species seems to depend, is a large spindle-shaped organ about half the length of the fish, thick in the middle and tapering toward the extremities, where it ends in front by two, and behind by a single tendenous cord; similar small tendenous attachments, about twenty-two in number, connect it on either side to the upper and lateral parts of the abdominal cavity. This organ, which is called the sound, is to be removed, opened, and stript of a thin vascular membrane which covers it both within and without, washed perhaps with lime water and exposed to the sun, when it will soon become dry and hard; it may require some further preparation to deprive it of its fishy smell, after which it may be drawn into shreds for the purpose of rendering it the more easily soluble. The fish which I examined weighed about two pounds and yielded about sixty-five grains of Isinglass, not quite pure, but containing about 10 per cent. of albumenous matter, owing perhaps to the individual from which it was taken being young and out of season, and not above a tenth part of the ordinary size of the species. But the solution after having been strained appeared to be equal to that of the best Isinglass, which costs in Calcutta from twelve to sixteen rupees a pound. As the subject thus seemed to be of consequence, I gave a portion of the substance in question to Dr. O'Shaughnessy for its chemical examination.

a. Breadth of the back,
b. Scale magnified,
c. Scale from lateral line magnified,
d. Air vessel or sound natural size.

Calcutta, 3rd May, 1839.

ART. V.—*Journal of the Mission which visited Bootan, in* 1837-38, *under Captain* R. BOILEAU PEMBERTON. *By* W. GRIFFITH, ESQ. *Madras Medical Establishment.**

The Mission left Gowahatti on the 21st December, and proceeded a few miles down the Burrumpootur to Ameengoung, where it halted.

On the following day it proceeded to Hayoo, a distance of thirteen miles. The road, for the most part, passed through extensive grassy plains, diversified here and there with low rather barren hills, and varied in many places by cultivation, especially of *sursoo*. One river was forded, and several villages passed.

Hayoo is a picturesque place, and one of considerable local note; it boasts of a large establishment of priests, with their usual companions, dancing girls, whose qualifications are celebrated throughout all Lower Assam. These rather paradoxical ministers are attached to a temple, which is by the Booteas and Kampas considered very sacred, and to which both these tribes, but especially the latter, resort annually in large numbers. This pilgrimage, however, is more connected with trading than religion, for a fair is held at the same time. Coarse woollen cloths and rock salt form the bulk of the loads which each pilgrim carries, no doubt as much for the sake of profit as of penance. The village is a large one, and situated close to some low hills; it has the usual Bengal appearance the houses being surrounded by trees, such as betel palms, peepul, banyan, and caoutchouc. To Nolbharee we found the distance to be nearly seventeen miles. The country throughout the first part of the march was uncultivated, and entirely occupied by the usual coarse grasses; the remainder was one sheet of paddy cultivation, interrupted only by topes of bamboos, in which the villages are entirely concealed; we found these very abundant, but small: betel palms continued very frequent, and each garden or enclosure was surrounded by a small species of screw pine, well adapted for making fences.

Four or five streams were crossed, of which two were not fordable: jheels were very abundant, and well stocked with water fowl and waders. At this place there is a small bungalow for the accommodation of the civil officer during his annual visit; it is situated close to a rather broad but shallow river. There is likewise a bund road.

We proceeded from this place to Dum-Dumma, which is on the Bootan boundary, and is distant ten miles from Nolbharee. We continued through a very open country, but generally less cultivated than

* Presented by the Government

that about Nolbharee; villages continued numerous as far as Dum-Dumma. This is a small straggling place on the banks of a small stream, the Noa Nuddee; we were detained in it for several days, and had the Booteas alone been consulted, we should never have left it to enter Bootan in this direction. The place I found to be very uninteresting.

December 31*st*. We left for Hazareegoung, an Assamese village within the Bootan boundary.

We passed through a much less cultivated country, the face of which was overrun with coarse grassy vegetation. No attempts appeared to be made to keep the paths clean, and the farther we penetrated within the boundary, the more marked were the effects of bad government. We crossed a small and rapid stream, with a pebbly bed, the first indication of approaching the Hills we had as yet met with. The village is of small extent, and provided with a Nam-ghur in which we were accommodated: it is situated on comparatively high ground, the plain rising near it, and continuing to do so very gradually until the base of the Hills is reached. There is scarcely any cultivation about the place.

We left on January 2d for Ghoorgoung, a small village eight miles from Hazareegoung; similar high plains and grassy tracts, almost unvaried by any cultivation, were crossed; a short distance from the village we crossed the Mutanga, a river of some size and great violence during the rains, but in January reduced to a dry bouldery bed. There is no cultivation about Ghoorgoung, which is close to the Hills, between which and the village there is a gentle slope covered with fine sward.

We entered the Hills on the 3d, and marched to Dewangari, a distance of eight miles. On starting we proceeded to the Durunga Nuddee, which makes its exit from the Hills about one mile to the west of Ghoorgoung, and then entered the Hills by ascending its bed, and we continued doing so for some time, until in fact we came to the foot of the steep ascent that led us to Dewangari. The road was a good deal obstructed by boulders, but the torrent contains at this season very little water.

The mountains forming the sides of the ravine are very steep, in many cases precipitous, but not of any great height. They are generally well wooded, but never to such a degree as occurs on most other portions of the mountainous barriers of Assam. At the height of about 1000 feet we passed a choky, occupied by a few Booteas, and this was the only sign of habitation that occurred.

We were lodged in a temporary hut of large size, some 200 feet below the ridge on which Dewangari is situated; our access to that

place being prohibited, as the Booteas, although long before informed of our approach and intentions, were not quite certain of our designs.

On the following day, after some fuss, we were allowed to ascend to the village, in which a pucka house had been appropriated for our accommodation.

Dewangari, the temples of which are visible from the plains of Assam, is situated on a ridge, elevated about 2100 feet above the level of the sea, and 1950 above that of the plains. The village extends some distance along the ridge, as well as a little way down its northern face. The houses, which are in most cases mere huts, amount to about 100; they are distributed in three or four scattered groups; amongst these a few pucka or stone-built houses of the ordinary size and construction occur; the only decent one being that occupied by the Soobah, who is of inferior rank.

Along the ridge three or four temples of the ordinary Boodhistical form occur; they are surrounded with banners bearing inscriptions, fixed longitudinally to bamboos. Attached to some of these temples are monumental walls of poor construction, the faces of which bear slabs of slate, on which sacred sentences are well carved.*

The village abounds in filth. The centre of the ridge is kept as a sort of arena for manly exercises; about this space there occur some picturesque simool trees, and a few fig trees, among which is the banyan.

There is no water course or spring near the village; the supply is brought from a considerable distance by aqueducts formed of the hollowed-out trunks of small trees. In one place this aqueduct is carried across a slip, but otherwise there is nothing tending to shew that difficulties existed, or that much skill would have been exerted had such really occurred.

During our long stay at this place we had many opportunities of forming acquaintance with the Soobah, as well as with the immediately adjoining part of his district. We found this almost uncultivated, and overran with jungle. No large paths were seen to point out that there are many villages near Dewangari; in fact the only two which bear marks of frequent communication, are that by which we ascended, and one which runs eastward to a picturesque village about half a mile distant, and which also leads to the plains.

The Soobah we found to be a gentlemanly unassuming man; he received us in a very friendly manner and with some state; the room

* Both to the east and west of Dewangari there is a picturesque religious edifice, with ornamented windows. Their effect is much heightened by the presence of the weeping Cypress, which situated as it was here, gave me an idea of extreme beauty.

was decently ornamented, and set off in particular by some well executed Chinese religious figures, the chief of which we were told represented the Dhurma Rajah, whose presence even as a carved block was supposed to give infallibility. We were besides regaled with blasts of music. His house was the most picturesque one that I saw, and had some resemblance, particularly at a distance, to the representations of some Swiss cottages. It was comparatively small, but as he was of inferior rank, his house was of inferior size.

The Soobah soon returned our visit, and in all his actions evinced friendship, and gentlemanly feeling; and we soon had reason to find that among his superiors at least we were not likely to meet with his like again. His followers were not numerous, nor, with the exception of one or two who had dresses of scarlet broad-cloth, were they clothed better than ordinarily.

The population of the place must be considerable; it was during our stay much increased by the Kampa people, who were assembling here prior to proceeding to Hazoo. Most of the inhabitants are pure Booteas; many of them were fine specimens of human build, certainly the finest I saw in Bootan: they were, strange to say, in all cases civil and obliging.

Cattle were tolerably abundant, and principally of that species known in Assam by the name of *Mithans;* they were taken tolerable care of, and picketed in the village at night: some, and particularly the bulls, were very fine, and very gentle. Ponies and mules were not uncommon, but not of extraordinary merits. Pigs and fowls were abundant.

The chief communication with the plains is carried on by their Assamese subjects, who are almost entirely Kucharees: they bring up rice and putrid dried fish, and return with bundles of manjistha.

On the 23rd, after taking a farewell of the Soobah, who gave us the Dhurma's blessing, and as usual decorated us with scarfs, we left for Rydang, the halting house between Dewangari and Kegumpa, and distant eight miles from the former place. We reached it late in the evening, as we did not start until after noon. We first descended to the Deo-Nuddee, which is 800 or 900 feet below the village, and which runs at the bottom of the ravine, of which the Dewangari ridge forms the southern side, and we continued ascending its bed, almost entirely throughout the march.

The river is of moderate size, scarcely fordable however in the rains; it abounds with the fish known to the Assamese by the name of Bookhar, and which are found throughout the mountain streams of the boundaries of the province. They, like all others, are considered

sacred, although after the first distrust had worn off, the Soobah did not object to my fishing. We passed a Sam Gooroo* engaged in building a wooden bridge; he was the only instance I met with of a Bootea priest making himself useful. He inquired of Capt. Pemberton, with much condescension, of the welfare of the 'Goombhanee' and his lordship the Governor General.

24th. Left for Khegumpa. The march was almost entirely an uninterrupted ascent, at least until we had reached 7000 feet, so that the actual height ascended amounted nearly to 5000 feet. It commenced at first over sparingly wooded grassy hills, until an elevation of about 4000 feet was attained, when the vegetation commenced to change; rhododendrons, and some other plants of the same natural family making their appearance. Having reached the elevation of 7000 feet by steep and rugged paths, we continued along ridges well clothed with trees, literally covered with pendulous mosses and lichens, the whole vegetation being extra tropical. At one time we wound round a huge eminence, the bluff and bare head of which towered several hundred feet above us, by a narrow rocky path or ledge overhanging deep precipices; and thence we proceeded nearly at the same level along beautiful paths, through fine oak woods, until we reached Khegumpa. The distance to which, although only eleven miles, took us the whole day to perform.

This march was a beautiful, as well as an interesting one, owing to the changes that occurred in the vegetation. It was likewise so varied, that although at a most unfavourable season of the year, I gathered no fewer than 130 species in flower or fruit. Rhododendrons of other species than that previously mentioned, oaks, chesnuts, maples, violets, primroses, &c., &c. occurred. We did not pass any villages, nor did we meet with any signs of habitation, excepting a few pilgrims proceeding to Hazoo.

Khegumpa itself is a small village on an exposed site; it does not contain more than twelve houses, and the only large one, which as usual belonged to a Sam Gooroo, appeared to be in a ruinous state. The elevation is nearly 7000 feet. The whole place bore a wintery aspect, the vegetation being entirely northern, and almost all the trees having lost their leaves. The cold was considerable, although the thermometer did not fall below 46°. The scarlet tree rhododendron was common, and the first fir tree occurred in the form of a solitary specimen of *Pinus excelsa*. In the small gardens attached to some of the

* So are they called from their peculiar sanctity. *Sam* is a priest, and *Gooroo* also a priest; each priest is therefore twice a priest.]

houses I remarked vestiges of the cultivation of tobacco and Probosa.* In the vallies however surrounding this place there seemed to be a good deal of cultivation, of what nature distance prevented me from ascertaining.

25th. Left for Sasee. We commenced by descending gradually until we had passed through a forest of oaks, resembling much our well known English oak; then the descent became steep, and continued so for sometime; we then commenced winding round spurs cloathed with humid and sub-tropical vegetation; continuing at the same elevation we subsequently came on dry open ridges, covered with rhododendrons. The descent recommenced on our reaching a small temple, about which the long leaved fir was plentiful, and continued without interruption until we reached a small torrent. Crossing this, we again ascended slightly to descend to the Dimree river, one of considerable size, but fordable. The ascent recommenced immediately, and continued uninterruptedly at first through tropical vegetation, then through open rhododendron and fir woods, until we came close upon Sasee, to which place we descended very slightly. This march occupied us the whole day. After leaving the neighbourhood of Khegumpa we saw no signs of cultivation; the country, except in some places, was arid; coarse grasses, long leaved firs, and rhododendrons forming the predominating vegetation. We halted at Sasee, which is a ruined village, until the 28th. The little cultivation that exists about it is of barley, buckwheat, and hemp.

28th. We commenced our march by descending steeply and uninterruptedly to the bed of the Geeri, a small torrent, along which we found the vegetation to be tropical; ascending thence about 500 feet, we descended again to the torrent, up the bed of which we proceeded for perhaps a mile; the ascent then again commenced, and continued until we reached Bulphai. The path was generally narrow, running over the flank of a mountain whose surface was much decomposed; it was of such a nature that a slip of any sort would in many places have precipitated one several hundred feet. The face of the country was very barren, the trees consisting chiefly of firs and rhododendrons, both generally in a stunted state. We reached Bulphai late in the evening; and the latter part of the march was very uncomfortable owing to the cutting severity of the wind. The vegetation was not interesting until we came on a level with Bulphai, when we came on oaks and some other very northern plants. We were well accommodated in this village, which is a very small one, situated in a somewhat

* *Eleusine coracana.*

sheltered place, and elevated to 6800 feet above the sea. The surrounding mountains are very barren on their southern faces, while on the northern, or sheltered side, very fine oak woods occur. The houses were of a better order than those at Sasee, and altogether superior to those of Khegumpa. They are covered in with split bamboos, which are secured by rattans, a precaution rendered necessary by the great violence of the winds, which at this season blow from the south or south-east. Bulphai is a bitterly cold place in the winter, and there is scarcely any mode of escaping from its searching winds. The vegetation is altogether northern, the woods consisting principally of a picturesque oak, scarcely ever found under an elevation of 6000 feet. There is one small patch of cultivation, thinly occupied by abortive turnips or radishes, and miserable barley. It was at this place that we first heard the very peculiar crow of true Bootan cocks, most of which are afflicted with enormous corns.

On the 31st we resumed our journey, ascending at first a ridge to the N. E. of Bulphai, until we reached a pagoda, the elevation of which proved to be nearly 8000 feet; and still above this rose to the height of about 10,000 feet a bold rounded summit, covered with brown and low grass. Skirting this at about the same level as the pagoda, we came on open downs, on which small dells, tenanted by well defined oak woods were scattered. After crossing these downs, which were of inconsiderable extent, we commenced to descend, and continued doing so until we came to Roongdoong. About a third of the way down we passed a village containing about twenty houses, with the usual appendage of Sam Gooroo's residence; and still lower we came upon a picturesque temple, over which a beautiful weeping cypress hung its branches. We likewise passed below this a large temple raised on a square terraced basement. From this the descent is very steep, until a small stream is reached, from which we ascended very slightly to the castle of Roongdoong, in the *loftiest* part of which we took up our quarters. From the time that we descended after crossing the downs, the country had rather an improved aspect, some cultivation being visible here and there. We met a good many Kampas, pilgrims, and one chowry tailed cow, laden with rock salt, which appears to be the most frequent burden.

There was more cultivation about Roongdoong than any other place we had yet seen, although even here it was scanty enough. It would appear that they grow rice in the summer, and barley or wheat during the winter; and this would seem to be the case in all those places of sufficient altitude where the fields were terraced. The elevation of the place is 5175 feet, yet a few orange trees appeared to flourish;

this was the highest elevation at which we saw these trees living. There is a species of *Atripleig*, the *Mooreesa* of the Assamese, likewise cultivated about Roongdoong: the seeds are eaten as well as the leaves, which form a sort of *turkaree*. The ingenuity of the Booteas was well shewn here by the novel expedient of placing stones under the ponies' feet to enable them to get at the contents of the mangers! The ponies appeared tolerably well fed, at least I saw them enjoy one good meal, consisting of wild tares and the heads of Indian corn, which had been previously soaked; besides these luxuries, they were supplied with a slab of rock as a rolling stone or scratch-back. Our host, the Dhoompa, who is appointed by the Deb himself, was an impudent drunken fellow, and presumed amazingly on his low rank. He was one of the most disagreeable and saucy persons we met with in Bootan.

Feb. 1*st*. Our march commenced by descending, gradually at first and then very rapidly, to the Dumree Nuddee; crossing this, which is of small size, at the junction of another torrent, we wound along the face of the mountain forming the right wall of the ravine, ascending very gradually at the same time. We continued thus until we came on the ravine of the Monass, which we followed upwards, the path running about 1000 feet above its bed for about two miles, when we reached Benka. We passed two or three small villages on the right side of the Dumree, and a few others were seen on its left. The country throughout was of a most barren appearance, the vegetation consisting of coarse grasses, stunted shrubs, and an occasional long leaved pine. Benka, or as it is better known Tassgong, is a small place situated on a precipitous spur, 1200 feet below which, on one side, the Monass roars along, and on the other a much smaller torrent. From either side of the village one might leap into eternity: it is elevated 3100 feet above the sea.

We were lodged in a summer house of the Soobah, about half a mile up the torrent, and in which, as it was an open house, and as they kept the best room locked up on the score of its being sacred, we were much incommoded by the furious gusts of wind sweeping as usual up the ravine.

The place itself is the Gibraltar of Bootan, consisting of a large square residence for the Soobah, decorated in the usual manner, of a few poor houses much crowded together, and the defences. These consist of round towers of some height, and a wall which connects the village with the tower; and on the opposite side of the torrent there are other defences of towers and outhouses. All seemed to be in a somewhat ruinous state.

A few days after our arrival we had an interview with the Soobah, on the open spot in front of our residence. On this he had caused to be pitched a small silken pavilion, about half the size of a sipahis' paul. He came in all possible state, with about thirty armed followers, preceded by his state band, which consisted of a shrill clarionet and a guitar, (guiltless of sound) a gong and a bell, ponies, a Tartar dog, gentlemen of the household, priests, all assisted in forming a long string which advanced in single file.

He was polite and obliging, and maintained his rank better than any other of the Soobahs we saw. After the interview, at the end of which presents of decayed plantains, papers of salt, scarfs, and strips of coarse blanket were returned, we were treated with music and dancing women, who only differed from their compeers of India in being elderly, ugly, very dirty, and poorly dressed. The spectators were then seated on the ground and regaled with rice and chong.

On his departure the noise far exceeded that attending on his advent. Shrieks and outcries rent the air, the musketoons made fearful report, and, in fact, every one of the followers, of sufficiently low rank, made as much noise as he could. The most curious parts of the ceremony were,—the manner in which they shuffled the Soobah off and on his pony; the mode in which the ponies' tails were tied up; and the petition of the head of the priests for at least one rupee.

It was here that we first heard of the deposition of the old Deb, and the consequent disturbances.

Feb. 5th. Punctually on the day appointed by the Soobah did we leave this place, and descended by a precipitous path to the Monass, which we crossed by a suspension bridge, the best and largest, I suspect, in Bootan. The bed of this river, which is of large size (the banks which are mostly precipitous being sixty or seventy yards asunder) and of great violence is 1300 feet below Benka. We then commenced ascending very gradually, following up the north side of the ravine, until we reached Nulka: the march was a very short one. The country was perhaps still more barren than any we had hitherto seen, scarcely any vegetation but coarse grasses occurring. Near Nulka the long leaved pine recommenced. We passed two miserable villages scarcely exceeded by Nulka, in which we took up our abode. No cultivation was to be seen, with the exception of a small field of rice below Nulka.

Feb. 6th. We descended to the Monass, above which Nulka is situated 6 or 700 feet, and continued along its right bank for a considerable time, passing here and there some very romantic spots, and one or two very precipitous places. On reaching a large torrent, the Koollong,

we left the Monass, and ascended the former for a short distance, when we crossed it by a wooden bridge. The remainder of the march consisted of an uninterrupted ascent up a most barren mountain, until we reached Kumna, a small and half-ruined village, 4300 feet above the sea.

Little of interest occurred: we passed a small village consisting of two or three houses and a religious building, and two decent patches of rice cultivation. The vegetation throughout was almost tropical, with the exception of the long leaved fir, which descends frequently as low as 1800 or 2000 feet. I observed two wretched bits of cotton cultivation along the Monass, and some of an edible *Labiata*, one of the numerous makeshifts ordinarily met with among Hill people.

Feb. 7th. Left for Phullung. We ascended at first a few hundred feet, and then continued winding along at a great height above the Koollong torrent, whose course we followed, ascending gradually at the same time, until we reached our halting place. As high as 5000 feet the Kumna mountain retained its very barren appearance; at that elevation stunted oaks and rhododendrons commenced, and at 5300 feet the country was well covered with these trees, and the vegetation became entirely northern.

Throughout the march many detached houses were visible on the opposite bank of the Koollong, and there appeared to be about them a good deal of terrace cultivation. On the left side of the torrent two villages were seen, both as usual in a ruinous state.

8th, and *9th*.—We were detained partly by snow, partly by the non-arrival of our baggage. On the 9th I ascended to a wood of *Pinus excelsa*, the first one I had noticed, and which occurred about 1000 feet above Phullung. The whole country at similar elevations was covered with snow, particularly the downs which we passed after leaving Bulphei. Tassgong was distinctly visible. The woods were otherwise composed of oaks and rhododendrons. At Phullung they were endeavouring to keep alive the wild indigo of Assam; a species of *Ruellia*, but its appearance shewed that it was unsuited to the climate.

Feb. 10th. To Tassangsee. We continued through a similar country, and at a like elevation, with the exception of a trifling descent to a small nullah, and an inconsiderable one to the Koollong, on the right bank of which, and about 500 feet above its bed, Tassangsee is situated. We crossed this torrent, which even here is of considerable size and not fordable, by means of an ordinary wooden bridge, and then ascended to the village. This is constituted almost entirely by the Soobah's house, which is a large quadrangular building; on the same side, but several hundred feet above the house,

there is a large tower ; also a small one on the same level, and some religious edifices. We were lodged over the stable.

The country about Tassangsee is picturesque, with large woods of *Pinus excelsa*, which here has much the habit of a larch, a few villages are visible on the same side of the Koollong, and a little cultivation. The Soobah was absent at Tongsa, to which place he had been summoned owing to the disturbances, so that we were relieved from undergoing the usual importunities and disagrèmens between his followers and ours. The place is said to be famous for its copper manufactures, such for instance as copper cauldrons of large dimensions ; but I saw nothing indicating the existence of manufacturers, unless it were a small village below the castle, and on the same side of the Koollong, which looked for all the world like the habitation of charcoal burners. A little further up this stream a few small flour mills occur.

Snow was visible on the heights around, and especially on a lofty ridge to the north. We found Tassangsee to be very cold owing to the violent south or south-east winds ; the thermometer however did not fall below 34°. Its elevation is 5270 feet, the vegetation entirely northern, consisting of primroses, violets, willows, oaks, rhododendrons, and pines ; very fine specimens of weeping cypress occur near this place.

Feb. 14*th.* Resumed our journey, interrupted as usual by the non-arrival of our baggage, and scarcity of coolies—and proceeded to Sanah. We descended at first to the torrent, which bounds one side of the spur on which the castle is built, and which here falls into the Koollong ; the march subsequently became a gradual and continued ascent, chiefly along its bed. We crossed two small torrents by means of rude flat wooden bridges, and passed two or three deserted villages. Snow became plentiful as we approached Sanah. This we found to be a ruined village, only containing one habitable house. It is situated on an open sward, surrounded with rich woods of oaks and rhododendrons, yews, bamboos, &c. Its elevation is very nearly 8000 feet.

Feb. 15*th.* We started at the break of day, as we had been told that the march was a long and difficult one. We proceeded at first over undulating ground, either with swardy spots, or through romantic lanes ; we then ascended an open grassy knoll, after passing which we came on rather deep snow. The ascent continued steep and uninterrupted until we reached the summit of a ridge 11,000 feet high. Although we had been told that each ascent was the last, we found that another ridge was still before us, still steeper than the

preceding one, and it was late in the day before we reached its summit, which was found to be nearly 12,500 feet. Above 9500 feet, the height of the summit of the grassy knoll before alluded to, the snow was deep; above 10,000 feet all the trees were covered with hoar-frost, and icicles were by no means uncommon. The appearance of the black pines, which we always met with at great elevations, was rendered very striking by the hoar-frost. Every thing looked desolate, scarce a flower was to be seen, and the occasional fall of hail and sleet added to the universal gloom.

The descent from the ridge was for the first 1500 feet, or thereabout, most steep, chiefly down zigzag paths, that had been built up the faces of precipices; and the ground was so slippery, the surface snow being frozen into ice, that falls were very frequent, but happily not attended with injury. It then became less steep, the path running along swardy ridges, or through woods. In the evening I came on the coolies, who had halted at a place evidently often used for that purpose, and who positively refused to proceed a single step further. But as Captain Pemberton and Lieut. Blake had proceeded on, I determined on following them, hoping that my departure would stimulate the coolies to further exertions. After passing over about a mile of open swardy ground I found myself benighted on the borders of a wood, into which I plunged in the hopes of meeting my companions; after proceeding for about half an hour slipping, sliding, and falling in all imaginable directions, and obtaining no answers to my repeated halloos; after having been plainly informed that I was a blockhead by a hurkarah, who as long as it was light professed to follow me to the death—"Master go on, and I will follow thee to the last gasp with love and loyalty"—I thought it best to attempt returning, and after considerable difficulty succeeded in reaching the coolies at 8½ P. M. when I spread my bedding under a tree, too glad to find one source of comfort.

I resumed the march early next morning, and overtook my companions about a mile beyond the furthest point I had reached; and as I expected, found that they had passed the night in great discomfort. We soon found how impossible it would have been for the coolies to have proceeded at night, as the ground was so excessively slippery from the half melted snow, and from its clayey nature, that it was as much as they could do to keep their legs in open day-light.

We continued descending uninterruptedly, and almost entirely through the same wood, until we reached Singé at 9½ A. M. The total distance of the march was fifteen miles—the greatest amount of ascent was about 4500 feet, of descent 6100 feet. We remained at

Singé up to the 18th, at which time some coolies still remained behind. This village, which is 6330 feet above the sea, is of moderate size, containing about twelve houses; in the best of these we were lodged, and it really was a good house, and the best by far we were accommodated with while in Bootan.

On the night of the 17th snow fell all around, though not within 1000 feet of Singé. The comparative mildness of the climate here was otherwise indicated by the abundance of rice cultivation about and below it. It stands on the border of the wooded and grassy tracts so well marked in the interior of Bootan, at least in this direction, and about midway on the left side of a very deep ravine, drained by the river Koosee. On both sides of this, villages were plentiful; on the opposite or western side alone I counted about twenty; about all there is much cultivation of rice and wheat; the surface of the earth where untilled, being covered with grassy vegetation and low shrubs.

Feb. 18th. We commenced a steep descent, and continued it until we came in sight of the river Koosee, which is not visible from Singé. We then turned to the north, following the course of the river upwards, the path running about 800 feet above its bed. Thence, after descending another ravine, drained by a tributary to the Koosee, we again ascended slightly, to re-descend to the Koosee, up the bed of which we then kept until we came to the Khoomar, a considerable torrent, which we crossed about 100 yards from its mouth by a wooden bridge; within a quarter of a mile of this we crossed the Koosee itself by a similar bridge, and then ascended gradually along its right bank until we reached Singlang, which place became visible after passing the Khoomar.

After arriving at the Koosee the country became barren, resembling much that about Tassgong; and the only cultivation we passed in this portion of the march was some rice along the bed of that river.

The usual delays took place at Singlang, and as it was the residence of a Soobah, we suffered the usual inconveniences. We were miserably lodged in a small open summer house, up a small ravine, and at a short distance from the castle, which is a large and rather irregular building.

The village itself is a poor one, most of the inhabitants being quartered in the castle. We had an interview with the Soobah in an open place close to the village: it was conducted with much less state than that at Tassgong. We found the Soobah to be very young, in fact almost a boy; he behaved civilly, and without any pretension. None of his armed men were present, and the whole number of Booteas collected to see the show could not have exceeded 100. We

sat in the open air, while the Soobah was sheltered by a paltry silken canopy. Nachnees more than ordinarily hideous were in attendance.

There is but little cultivation about this place, which is 4520 feet above the sea, and the surrounding mountains are very barren. About the village I noticed a few stunted sugar canes, some peach and orange trees, the castor-oil plant, and a betel vine or two. The only fine trees near the place were weeping cypresses; the simul also occurs.

Feb. 23rd. After the usual annoyances about coolies and ponies, we left Singlang without regret, for it was a most uninteresting place. We commenced by an ascent of about 1000 feet, and then continued following the course of the Koosee *downwards*. We continued retracing our steps until we reached Tumashoo, to which place we scarcely descended, and on arriving found ourselves opposite Singé, and not more, as the crow flies, than three miles from it. We were told subsequently that there was a direct road from Singé to this, which is about the centre of the populous parts of the country I have mentioned as being visible from Singé; so that it was quite plain that we had been taken so much out of our way in order to gratify the Soobah by enabling him to *return* us some decayed plantains, balls of ghee, and dirty salt. The road throughout was good, and evidently well frequented. At an elevation of about 6000 feet we came on open woods of somewhat stunted oaks and rhododendrons; the only well wooded parts we met with being such ravines as afforded exit to water courses. We passed several villages in the latter part of the march, some containing 20 and 30 houses, and met with a good deal of cultivation as we traversed that tract, the improved appearance of which struck us so much from Singé.

Tumashoo is an ordinary sized village, about 5000 feet in elevation. We were lodged in the Dhoompá's house. I observed that the cattle here, which were *Mithans*, were kept in farm yards, better supplied with straw than the poor beasts themselves. A few sheep were likewise seen.

Feb. 24th. Left for Oonjar, ascending at first over sward or through a fir wood for about 800 feet, when we crossed a ridge, and thence descended until we came to a small torrent which we crossed; thence we ascended gradually, until we surmounted a ridge 7300 feet high; descending thence very gradually until we came over Oonjar, to which place we descended by a steep by-path for a few hundred feet. The road was generally good, winding along at a considerable height above the Koosee, until we finally left it on its turning to the south. Singé was in sight nearly the whole day. The

features of the country were precisely the same. At the elevation of 7300 feet the woods became finer, consisting of oaks and rhododendrons, rendered more picturesque from being covered with mosses, and a grey pendulous lichen, a sure indication of considerable elevation. Various temples and monumental walls were passed, and several average sized villages seen in various directions. A fine field of peas in full blossom was noticed at 5500 feet, but otherwise little cultivation occurred. Oonjar is a small village at an elevation of 6370 feet.

Feb. 25th. Leaving this place, we continued winding along nearly at the same altitude until we descended to the river Oonjar, which drains the ravine, on the right flank of which the village is situated. This river, which is of moderate size, is crossed twice within 200 yards. From the second bridge one of the greatest ascents we had yet encountered commenced; it was excessively steep at first, but subsequently became more gradual. It only terminated with our arrival at the halting place, which we denominated "St. Gothard," but which is known by the name Peemee. Its elevation is about 9700 feet, and we had ascended from the bridge as much as 4350 feet. Snow commenced at 7500 feet, and became heavy at 8500 feet; Peemee was half buried in it, and ornamented with large icicles: it consists of one miserable hut. This hut would not have withstood the attacks of another such party as ours, for the men made use of its bamboos for firewood, and the horses and mules eat very large portions of it. Our people were put considerably out from not considering it proper to use snow water, the only fluid to be procured, as there is no spring near.

Feb. 26th. We continued the ascent through heavy snow. For the first 1000 feet it was easy enough, but after that increased much in difficulty. Great part of the path was built up faces of sheer precipices. About noon we passed through the pass of Rodoola, which consists of a gap between two rocks, barely wide enough to admit a loaded pony. One of the rocks bore the usual slab with the mystic sentence "*Oom mainee pamee oom.*" There is nothing striking in the place, which besides is not the highest part of the mountain traversed. The elevation was found to be 12,300 feet.

The remainder of the ascent was very gradual, but continued for about 1½ miles; and I consider the actual pass from which we commenced descending to be at least 12,600 feet. The descent was at first very rapid, passing down the bold face of the mountain, which was covered entirely with stout shrubby rhododendrons. We then descended gradually through a fine wood of the black fir. On recommencing the steep descent we passed over swardy patches surrounded

by fir woods, and we continued through similar tracts until within 1000 feet of our halting place, to which we descended over bare sward.

The march, which was one of thirteen miles, lasted nine hours; the greatest ascent was nearly 4000 feet, the greatest descent nearly 5000 feet. It was with great difficulty that many of our followers succeeded in effecting it: with the usual apathy of natives, they wanted to remain in a ruined log hut, at an elevation of 12,500 feet, without food, instead of pushing on. Capt. Pemberton very properly ejected them all, and when once they had passed the snow, they regained a good deal of their miserable spirit. The road throughout the ascent was buried in snow, the depth of which alone enabled us to cross one very bad place where the constructed road appeared to have given way, and at which most of our ponies had narrow escapes. On the descent the snow became scanty at 9500 feet, and at 9000 feet disappeared almost entirely, lingering only in those places which throughout the day remain obscured in shade.

From the summit of Rodoola a brief gleam of sunshine gave us a bird's-eye view of equally lofty ridges running in every direction, all covered with heavy snow.

The vegetation of the ascent was very varied, the woods consisting of oaks, rhododendrons, and bamboos, up to nearly 11,000 feet. Beyond this the chief tree was the black fir; junipers, alpine polygonums, a species of rhubarb, and many other alpine forms presented themselves in the shape of the withered remains of the previous season of active vegetation. That on the descent was less varied, the trees being nearly limited to three species of pines, of which the black fir scarcely descended below 11,600 feet, when it was succeeded by a more elegant larchlike species, which I believe is *Pinus Smithiana*; this again ceased toward an altitude of 9500 feet, when its place was occupied by *Pinus excelsa*, now a familiar form.

We found Bhoomlungtung to occupy a portion of rather a fine valley. The village is of moderate size, but of immoderate filth, only exceeded in this respect by its tenants, to whom no other Booteas could come near in this, as it would seem, necessary qualification of an inhabitant of a cold, bleak, mountainous country; it is situated on the left bank of a good sized stream. We were lodged in the chief house, but were annoyed beyond measure by the smoke arising from a contiguous cook room, in which operations were going on day and night. The valley is not broad, but is two or three miles in length: it is surrounded on all sides, but especially to the south and east by lofty mountains. The elevation of Bhoomlungtung is nearly 8700 feet,

and we considered it to be the most desirable spot we had yet met with.

The valley is for the most part occupied by wheat fields, but the prospect of a crop appeared to me very faint. Two or three villages occur close to Bhoomlungtung. The tillage was better than any we had seen, the fields being kept clean, and actually treated with manure, albeit not of the best quality; in a few instances they were surrounded with stone walls, as were the court yards of all the houses, but more commonly the inroads of cattle were considered sufficiently prevented by strewing thorny branches here and there. The houses were of ordinary structure, but unspeakably filthy.

With the exception of a sombre looking oak near Bhoomlungtung, and some weeping willows, the arboreous vegetation consists entirely of firs. The shrubby vegetation is northern, and so is the herbaceous, but the season for this had not yet arrived. It was here that I first met with the plant called after Mr. James Prinsep; the compliment is not, in Bootan at least, enhanced by any utility possessed by the shrub, which is otherwise a thorny, dangerous looking species. Here too we first saw English looking magpies, larks, and red-legged crows.

March 1st. Proceeded to Byagur or Juggur. We were told that the march was a short one, and that we should continue throughout down the bed of the Tung-Tchien, the river of Bhoomlungtung; we found, however, that we soon had to leave this, and commence ascending. After a second descent to a small nullah, we encountered a most tedious ascent, which continued until we surmounted a ridge overlooking Byagur, to which place we descended very rapidly. The height of this ridge was 9950 feet, yet we did not meet with a vestige of snow. The distance was fourteen miles. We passed two or three small villages, but saw scarcely any vegetation after leaving the valley. The vegetation continued the same, the road traversing either sward or fir woods, consisting entirely of *Pinus excelsa*.

The valley in which Byagur is situated is still larger than that of Bhoomlungtung: it is drained by a large river which is crossed by a somewhat dilapidated wooden bridge; the elevation is about 8150 feet. The village so called is a moderately sized one; but there are several others in the valley, which is one of the very few decently inhabited places we met with. The inhabitants are much cleaner than those of Bhoomlungtung. The Soobah was absent at Tongsa; his castle, which is a very large, irregular, straggling building, is situated on a hill 500 feet above the plain, some of its defences, or outworks, reaching nearly to the level of the valley. During the hot weather

it is occupied by Tongsa Pillo, on which occasion the Soobah retires to Bhoomlungtung.

The cultivation is similar to that of the other valley, but the crops looked very unpromising. The soil is by no means rich, and the wind excessively bleak; wheat or barley are the only grains cultivated. The mountains which hem in this valley are not very lofty; to the north, in the back ground, perpetual snow was visible. To our west was the ridge which we were told we should have to cross, and which in its higher parts could not be less than 12,000 feet.

March 4th. We commenced ascending the above ridge almost immediately on starting; surmounting this, which is of an elevation at the part we crossed of 11,035 feet, we continued for sometime at the same level, through fine open woods of *Pinus Smithiana:* having descended rapidly afterwards to a small nullah, 9642 feet in elevation, we then reascended slightly to descend into the *Jaisa* valley. On the east side of the ridge, i. e. that which overlooks Byagur, we soon came on snow, but none was seen on its western face, notwithstanding the great elevation. The country was very beautiful, particularly in the higher elevations. I may here advert to the bad taste exhibited in naming such objects after persons, with whom they have no association whatever. As it is not possible for all travellers to be consecrated by genera, although this practice is daily becoming more common, we should connect their names with such trees as are familiar to every European. As we have a *Pinus Gerardiana* and *Webbiana*, so we ought to have had *Pinus Herbertiana* and *Moorcroftiana*, &c. By so doing, on meeting with fir trees among the snow-clad Himalayas, we should not only have beautiful objects before us, but beautiful and exciting associations of able and enduring travellers. Of Capt. Herbert, the most accomplished historian of these magnificent mountains, there is nothing *living* to give him a "local habitation and a name." It will be a duty to me to remedy this neglect; and if I have not a sufficiently fine fir tree hitherto undescribed in the Bootan collection, I shall change the name of the very finest hitherto found, and dignify it by the name *Herbertiana*. The prevailing tree was the Smithian pine. We saw scarcely any villages, and but very little cultivation. Jaisa is a good sized village; it was comparatively clean, and the houses were, I think, better than most we had hitherto seen. We were lodged in a sort of castle, consisting of a large building, with a spacious flagged court yard, surrounded by rows of offices. The part we occupied fronted the entrance, and its superior pretensions were attested by its having an upper story.

There is a good deal of wheat cultivation around the village, which is not the only occupant of the valley: this is the highest we had yet seen, and is perhaps one of the highest inhabited vallies known, as it is 9410 feet above the sea; it is drained by a small stream, and is of less extent than either that of Byagur or Bhoomlungtung. The surrounding hills are covered with open fir woods, and are of no considerable height. Larks, magpies, and red-legged crows, continued plentiful, but on leaving this valley we lost them.

March 5th. We proceeded up the valley, keeping along the banks of the stream for sometime; we then commenced ascending a ridge, the top of which we reached about noon; its elevation was 10,930 feet. The descent from this was for about 2500 feet very steep and uninterrupted, until we reached a small torrent at an elevation of 8473 feet; from this we ascended slightly through thick woods of oak, &c. until we came on open grassy tracts, through which we now gradually descended at a great height above the stream, which we had left a short time before. We continued descending rather more rapidly until we came to a point almost immediately above Tongsa, by about 1000 feet; from this the descent was excessively steep. The distance was 13 miles. On the ascent snow was common from a height of 9000 feet upwards. The vegetation on this, or the eastern side, was in some places similar to that above Byagur. Beautiful fir woods formed the chief vegetation, until we came close to the summit, when it changed completely. Rhododendrons, *Bogh puttah*, and a species of birch, and bamboos, were common, mixed with a few black pines. The woods through which we descended, were in the higher elevations almost entirely of rhododendrons; and lower down chiefly of various species of oak and maple—the former being dry and very open, the latter humid and choked up with underwood. After coming on the open grassy country we did not revert to well wooded tracts.

No villages occurred, nor did we see any signs of cultivation after leaving the valley of Jaisa until we came near Tongsa, above which barley fields were not uncommon. Tongsa, although the second, or at any rate the third place in Bootan, is as miserable a place as any body would wish to see. It is wretchedly situated in a very narrow ravine, drained by a petty stream, on the tongue of land formed by its entrance into the large torrent Mateesum, which flows 1200 feet below where the castle stands. The village is 6250 feet in altitude: it consists of a few miserable houses, one of the worst of which was considerately lent to us. The castle is a large and rather imposing building, sufficiently straggling to be relieved from heaviness of appearance: it is so overlooked, and indeed almost overhung by some

of the nearest mountains, that it might be knocked down by rolling rocks upon it. It is defended by an outwork about 400 feet above.

The surrounding country is uninteresting, the vegetation consisting of a few low shrubs and some grasses: of the former the most common are a species of barberry, and a hitherto undescribed genus of *Hamamelidæ*. No woods can be reached without ascending 12 or 1500 feet.

Barley was the chief cultivation we saw, but the crops alternated with rice, which is here cultivated, as high as 6800 feet. In the gardens attached to the cottages, or rather huts, we observed the almond and pear in full blossom: the only other trees were two or three weeping cypresses and willows, and a solitary poplar.

Our reception was by no means agreeable. I was roared to most insolently to dismount while descending to the castle; our followers were constantly annoyed by the great man's retainers; and, in fact, we got no peace until we had an interview with the Pillo on the 15th. Before the arrival of this personage, who had just succeeded to office, great efforts were made to bring about an interview with the ex-Pillo, and a stoppage of supplies was actually threatened in case of refusal. The firmness of Capt. Pemberton was however proof against all this.

It had been previously arranged that the former Pillo, the uncle of the present one, should be admitted at this interview on terms of equality; this kindness on the part of the nephew being prompted probably by the hopes of securing his uncle's presents afterwards. We were received with a good deal of state, but the apartment in which the meeting took place was by no means imposing, or even well ornamented. The attendants were very numerous, and mostly well-dressed, but the effect of this was lessened by the admission of an indiscriminate mob. We were not admitted however into the presence without undergoing the ordeals which many orientals impose on those who wish for access to them.

We were most struck with the difference in appearance between the old and new Pillos: the former was certainly the most aristocratic personage we saw in Bootan; the latter, a mean looking, bull-necked individual. A novel part of the ceremony consisted in the stirring up of a large can of tea, and the general recital of prayers over it, after which a ladleful was handed to the Pillos, who dipped their fore-finger in it, and so tasted it.

The meeting passed off well; and afterwards several less ceremonious and more friendly meetings took place. We took leave on the 22nd. This interview was chiefly occupied in considering the list of presents, which the Pillo requested the British Government would do themselves the favour of sending him. He begged most

unconscionably, and I thought that the list would never come to an end; and he was obliging enough to say, that any thing he might think of subsequently would be announced in writing. He was very facetious, and evidently rejoiced at the idea of securing so many good things at such trifling expense as he had incurred in merely asking for them. Nothing could well exceed the discomfort we had to undergo during our tedious stay at this place. Our difficulties were increased subsequently to our arrival by the occurrence of unsettled weather, during which we had ample proofs that Bootan houses are not always water-proof; we were besides incessantly annoyed with a profusion of rats, bugs, and fleas; nor was there a single thing to counterbalance all these inconveniences, and we consequently left the place without the shadow of a feeling of regret.

On the 23rd of March we resumed our journey; and having traversed the court yard of the castle, we struck down at once to the river Mateesum by a very steep path. Having crossed this by a bridge, we gradually ascended, winding round the various ridges on the right flank of the ravine of this river. We left it when it turned to the southward, in which direction Bagoa-Dooar was visible, and continued ascending gradually until we reached Taseeling, seven miles from Tongsa, and 7230 feet above the sea.

Taseeling consists of a large house, principally used as a halting-place for *chiefs* going to and from Punukka and Tongsa. The surrounding mountains are rather bare, as indeed is the country between it and Tongsa. There is some cultivation to be seen around it, and several villages. As we approached Taseeling open oak and rhododendron woods recurred. The vegetation near the Mateesum was subtropical; the road was good, and in one place was built in zigzag up the face of a cliff.

March 24th. To Tchinjipjee. We commenced by ascending until we had surmounted a ridge about 800 feet above Taseeling; during the remainder of the march we traversed undulating ground at nearly the same altitude, at first through an open country, afterward through beautiful oak and magnolia woods, until we came on the torrent above which we had been ascending since leaving the Mateesum; a little farther on we came on the finest temple we had seen, and situated in a most romantic spot. It stood on a fine patch of sward, in a gorge of the ravine, the sides of which were covered with beautiful cedar-looking pines; the back ground was formed by lofty mountains covered with heavy snow.

Following the river upwards for about a mile and a half, we reached Tchinjipjee, which is situated on the right bank of the torrent.

The march was throughout beautiful, particularly through the forest, which abounded in picturesque glades. No villages or cultivation were seen.

Tchinjipjee is perhaps the prettiest place we saw in Bootan; our halting place stood on fine sward, well ornamented with (*Quercus seme carpifolia?*) very picturesque oaks, and two fine specimens of weeping cypress. The surrounding hills are low, either almost entirely bare or clothed with pines. The village is of ordinary size, and is the only one visible in any direction; its elevation is 786 feet. There is some cultivation about it, chiefly of barley, mixed with radishes.

March 27th. We continued following the river upwards, the path running generally at a small height above its bed. Having crossed it by a rude wooden bridge, we diverged up a tributary stream, until we reached a small village; we thence continued ascending over easy grassy slopes, here and there prettily wooded, until we reached the base of the chief ascent, which is not steep, but long, the path running along the margin of a rhododendron and juniper wood: the height of its summit is 10,873 feet. Thence to Rydang was an uninterrupted and steep descent, the path traversing very beautiful woods of rhododendrons, oaks, yews, &c. Snow was still seen lingering in sheltered places above 10,000 feet. The march throughout was beautiful. In the higher elevations the *Bogh Pat* was very common.

Besides the village mentioned, two temporary ones were seen near the base of the great ascent, built for the accommodation of the Yaks and their herdsmen: of this curious animal two herds were seen at some distance.

Rydang is prettily situated towards the bottom of a steep ravine: its elevation is 6963 feet. A few villages occur about it, with some barley and wheat cultivation.

March 28th. We descended directly to the river Gnee, which drains the ravine, and continued down it sometime, crossing it once; then diverging up a small nullah we commenced an ascent, which did not cease until we had reached an elevation of 8374 feet. Continuing for sometime at this elevation we traversed picturesque oak and rhododendron woods, with occasionally swardy spots; subsequently descending for a long time until we reached Santagong.

Oak and rhododendron woods continued common until we approached Santagong, in the direction of which the trees became stunted, and the country presented a barren aspect. Several villages were however seen in various directions, surrounded with cultivation.

Santagong is 6300 feet above the sea ; it is a small village, but the houses are better than ordinary. The surrounding country, especially to the north, is well cultivated, and the villages numerous. The country is bare of trees ; almost the only ones to be seen are some long leaved firs, a short distance below Santagong, close to a small jheel abounding in water fowl.

March 29th. From Santagong we proceeded to Phain, descending immediately to the stream, which runs nearly 1800 feet below our halting place. Crossing this, as well as a small tributary, we encountered a steep ascent of 1000 feet. Subsequently we wound along, gradually ascending at the same time, until we reached an inconsiderable ridge above Phain, to which place we descended slightly. The distance was six miles. The country was bare in the extreme, and after crossing the stream above mentioned, villages became rather scanty. Towards Phain the soil became of a deep red colour.

This place, which is 5280 feet above the sea, is a small village, containing six or seven tolerable houses. The country is most uninteresting and uninviting, scarce a tree is to be seen, the little vegetation that does exist consisting of low shrubs. A few villages are scattered about it, and there is some rice cultivation.

We were detained here until the 1st of April, in order that we might repose after our fatigues ; but in reality to enable the Punukka people to get ready our accommodations. Wandipore, a well known castle situated in the Chillong pass, is just visible from Phain, below which it appears to be some 1200 feet, and about three miles to the south west. Its Zoompoor, one of the leading men in Bootan, made some ineffectual attempts to take us to Punukka viâ his own castle; various were the artifices he resorted to for this purpose, but he failed in all. Among others, he sent a messenger to inform us that the Deb and Dhurma were both there, and very anxious to meet us, and that after the meeting they would conduct us to Punukka.

April 1st. To Punukka. We descended rather gradually towards the Patchien, proceeding at first north-west, and then to the north. On reaching the stream, which is of considerable size, we followed it up, chiefly along its banks, until we arrived at the capital, no view of which is obtained until it is approached very closely The valley of the Patchien was throughout the march very narrow ; there was a good deal of miserable wheat cultivation in it, and some villages, all of moderate size. The country continued extremely bare. The distance was about eleven miles. Punukka, the second capital in Bootan, the summer residence of a long line of unconquered monarchs—Punukka to which place we had been so long looking forward with feelings of de-

light, although the experience of Tongsa ought to have taught us better, disappointed all of us dreadfully. For in the first place I saw a miserable village, promising little comfort as respects accommodation, and one glance at the surrounding country satisfied me that little was to be done in any branch of natural history. For a narrow, unfruitful valley, hemmed in by barren hills, on which no arboreous vegetation was to be seen, except at considerable elevation, gave no great promise of botanical success.

On reaching the quarters which had been provided for us, and which were situated in front of the palace, we were much struck with the want of care and consideration that had been shewn, particularly after the very long notice the Booteas had received of our coming, and the pressing invitations sent to meet us.

These quarters had evidently been stables, and consisted of a square enclosure surrounded by low mud walls. Above the stalls small recesses, scarcely bigger than the boxes which are so erroneously called a man's "long home," had been made for our special lodgements; that of the huzoor, Captain Pemberton, was somewhat larger, but still very much confined. Having added to these a roof formed of single mats, an oppressive sun, and a profusion of every description of vermin, Capt. Pemberton determined on renting quarters in the village, and this, owing to his liberality, was soon accomplished; and from the two houses we occupied did we alone obtain comfort among the numerous annoyances we were doomed to experience during our lengthened stay.

The capital of Bootan is for pre-eminence, miserable. The city itself consists of some twelve or fifteen houses, half of which are on the left bank of the river, and two-thirds of which are completely ruinous, and the best of these '*Capital*' houses were far worse than those at Phain or Santagong. &c. Around the city, and within a distance of a quarter of a mile, three or four other villages occur, all bearing the stamp of poverty, and the marks of oppression.

The palace is situated on a flat tongue of land formed by the confluence of the Matchien and Patchien rivers. To the west it is quite close to the west boundary of the valley, the rivers alone intervening. It is a very large building, but too uniform and too heavy to be imposing: it is upwards of 200 yards in length, by perhaps 80 in breadth. Its regal nature is attested by the central tower, and the several coppered roofs of this.

The only cheering objects visible in this capital, are the glorious Himalayas to the north, and a Gylong village 12 or 1500 feet above the palace to the west; elsewhere all is dreary, desolate looking, and hot.

During the first few days of our stay, and indeed until our interview with the Deb, we were much annoyed by the intruding impertinence and blind obstinacy of his followers. They were continually causing disputes either with the sentries or our immediate followers, and it was only by repeated messages to the palace, stating the probable consequence of such a system of annoyance, that Captain Pemberton succeeded in obtaining any respite.

After many delays, we were admitted to the Deb's presence on the 9th. Leaving our ponies, we crossed the bridge built over the Patchien, which was lined with guards, and defended by some large, wretchedly constructed wall pieces. We then entered a paved yard, and thence ascended by some most inconvenient stairs to the palace, the entrance to which was guarded by a few household troops dressed in scarlet broad cloth. We then crossed the north quadrangle of the palace, which is surrounded with galleries and apartments, and was crowded with eager spectators, and ascending some still more inconvenient, or even dangerous stairs, reached a gallery, along which we proceeded to the Deb's receiving room, which is on the west face of the palace: at the door of this the usual delays took place, these people supposing that their importance is enhanced by the length of delay they can manage to make visitors submit to.

The Deb, who was an ordinary looking man, in good condition, received us graciously, and actually got up and received his Lordship's letter standing; the usual conversation then took place by means of interpreters, and the Deb having received his presents, and presented us with usual plantains, ghee, and some walnuts, dismissed us; and this was the first and last time I had the honour of seeing him, as I was indisposed at the time of our leaving. To return, the room was a good sized one, but rather low; it was supported by well ornamented pillars, hastily hung with scarfs and embroidered silk. The most amusing part of the ceremony was that exhibited by the accountant general's department, who were employed in counting and arranging courie shells—really emblematic of the riches of the kingdom—apparently with no other aim than to re-count, and re-arrange them, yet they were very busily engaged in writing the accounts. A day or two after, our interview with the Dhurma took place. He received us in an upper room of the quadrangular central tower: while we were in his presence we remained standing, in compliment to his religious character. The Dhurma Rajah is a boy of eight or ten years old, and good looking, particularly when the looks of his father, the Tungso Pillo, are taken into consideration. He sat in a small recess, lighted chiefly with lamps, and was prompted by a very venerable looking,

grey-headed priest. He had fewer attendants, and his room was less richly ornamented than that of the Deb. Around the room sat priests busily employed in muttering charmed sentences from handsome gilt lettered black books, which reminded me of those used in some parts of Burmah.

Very few of our attendants saw either of the Rajahs, and it was expected that no one would presume to enter the Dhurma's presence empty handed. To some of the sipahis, who were anxious to see him, his confidential advisers said, "Give forty rupees, come into the quadrangle under the Dhurma's window, and then you may see him, or you may not see him; I will not be answerable for any thing, but receiving the forty rupees."

During our protracted stay at this place, nothing particularly worthy of notice occurred. Intrigues seemed to be constantly going on, and the trial of temper on the part of Captain Pemberton must have been very great; it was however soon evident that no business could be transacted with a Bootea Government without being enabled first to enforce abundance of fear, and consequently any amount of agreement from them; messages to and fro passed continually, the bearer being a very great rascal, in the shape of the Deb's Bengal Moharrer. Thus he would come and appoint the next day for a meeting; then he would return and say, that such a place was better than such a place; as evening drew near he would come and say, unless you agree to such and such, there will be no meeting; and after bearing a message that no change in this respect would be made, he would make his appearance and say, all the minsters were sick, and so could not meet.

My only amusement out of doors was a morning walk up or down the valley. I was prompted to this chiefly by the pangs of hunger, as the Bootea supplies were very short, indeed wild pigeons afforded me at least some relief. During the day I examined such objects as my collectors brought in, for it was too hot to think of being out after 9 A. M. I also had a few Bootea patients, most of whom were labouring under aggravated forms of venereal.

The climate of Punukka has but little to recommend it, and in fact nothing, if viewed in comparison with the other places we had seen in Bootan. The greatest annoyance existed in the powerful winds blowing constantly throughout the day up the valley, and which were often loaded with clouds of dust. The mean temperature of April may be considered as 71°.

The maximum heat observed was 83°, the minimum 64°. The mean temperature of the first week of May was 75° 3′; the maximum

80°, and the minimum 70°. The cultivation in the valley, the soil of which seems very poor, containing a large proportion of mica, was during our stay limited to wheat and buck-wheat, but scarcely any of the former seemed likely to come to ear. Ground was preparing for the reception of rice, which is sown and planted in the usual manner. Crops just sown are immediately eaten up by the swarms of sacred pigeons that reside in the palace, so that husbandry is by no means profitable; more especially as there are other means of providing for the crops, such as they may be. Thus we saw several small fields, amounting perhaps to an acre in extent, cut down to provide fodder for some ponies that had lately shared in a religious excursion to Wandipore.

Cattle are not frequent. There were some pigs. The fowls were of the most miserable description, and very scarce. In spite of offers of purchase and plenty of promises, we were throughout allowed three a day, and they were rather smaller than pigeons. Towards the latter end of our stay, rice became bad and scarce.

We saw nothing indicating any degree of trade worth mentioning. Parties changing their residence frequently passed through from the north-east, generally accompanied by ponies, whose most common burdens appeared to be salt. No direct intercourse appears to exist with Thibet, as even the tea, which they consume in large quantities, is said to come from Paro Pillo's.

There are a great number of Assamese slaves about Punukka; indeed all the agricultural work, as well as that of beasts of burden, appears to devolve upon these unfortunate creatures, who are miserably provided for, and perhaps dirtier than a genuine Bootea himself. During my morning walks I was almost daily entreated for protection. In one case only, and in this by the merest accident, was Captain Pemberton enabled to get such evidence as authorised him to claim it as entitled to British protection. Connected with this case is an act of black treachery, to which I shall hereafter refer.

We stopt so long here, and we had daily so many instances proving that no confidence could be placed on any thing coming from the palace, that I began at last to despair of getting away. The old Deb was very anxious to see us, and the new Deb still more anxious that we should accompany him when he left Punukka, in the hope that the presence of the Mission would be advantageous to him.

It wa entirely owing to the firmness of Captain Pemberton that we were enabled to avoid such a disagreeable meeting; and the Deb, feeling at last convinced that his views could not be carried into effect, gave orders for getting rid of us as speedily as possible; and on

the 9th May at noon we left Punukka, the most uninviting place I have ever seen in a hilly country. On the morning of the same day there was a demonstration in the palace of great boldness; the roof of the northern side was covered with troops, who shouted, fired, and waved banners.

We crossed both bridges of the palace without any interruption or annoyance, at which I was most agreeably surprised; and then gradually ascended the right flank of the valley, following the course of the united rivers, Patchien and Matchien. We proceeded in this direction for sometime, until we came on a ravine affording an outlet to a tributary of the Panukka river, which we then followed, gradually descending through fir woods until we reached the torrent. Crossing this, which is a small one, we commenced the ascent to Telajong, which we soon reached. We were lodged in the castle, which is in the hands of the old Deb's followers, and who threatened to fight very hard. Its elevation is about 5600 feet, and it is situated towards the base of very steep mountains, which we crossed next day. It is somewhat ruinous, but might even in Bootea hands make a stout defence against a Bootea force.

The march was a moderate one; up to the ravine the country had the same barren aspect, but on changing our direction we came on fir woods. About Telagong the country is well wooded, chiefly with oaks, and the vegetation is considerably varied. Near the torrent we met with a village or two, and a little cultivation, chiefly of buck wheat.

April 10*th*. We descended to a small nullah just below the castle, and then commenced an ascent which lasted for three or four hours, and which was generally moderately steep. On surmounting the ridge, which was of an elevation of about 10,000 feet, we commenced a long, and uninterrupted descent along the course of a small torrent (the path being well diversified with wood and glade) until we reached Woollokha, distant fourteen and half miles from Telagong.

About 1200 feet above this we came on rather fine wheat cultivation, among which two or three villages were situated. Above this elevation we came on fine woods of oaks and yews, diversified with swardy spots; and on reaching the summit of the ridge an open sward with beautiful rhododendron, birch, and juniper woods. Herbaceous monocotyledons abounded here, in fact the vegetation altogether was very rich, and the first spring vegetation we had yet met with. Gooseberries and Currants were common from 9000 feet upwards: Euphorbius, Primroses, Saxifragis, Clematises, Anemones, Ranunculuses, &c., were some among the many European forms that I met

with on this march. Near the summit, on the descent, a genuine larch was observed, and lower down two species of poplar were very common. The scenery was generally very beautiful. We passed a delightfully situated Gylong village not much below the summit, and near Woollookha saw Symtoka, a rather large square building belonging to the Deb Rajah, situated two or three hundred feet above our road.

Woollookha is a good sized village, and the houses are very good: it is close to the river Teemboo, which drains Tassisudon valley, a few miles distant to the north. There are several villages around it, and a good deal of cultivation of alternating crops of barley, wheat, and rice. The valley, if indeed it can be called so, for it is very narrow, is picturesque enough, although the surrounding hills are not well wooded. The banks of the river, which here flows gently enough, are well ornamented with weeping willows.

11*th*. We continued our route following the river, the path generally laying down its bed, or close to it, occasionally ascending two or three hundred feet above it. Halted at Lomnoo, an easy march. The features of the country remained the same until we neared our halting place, when woods of *Pinus excelsa* became very common; roses occurred in profusion, and the vegetation generally consisted of shrubs; villages were tolerably frequent, and the cuckoo* was again heard.

12*th*. To Chupcha. Continued for some time through a precisely similar country, still following the river, but generally at some height above its bed. After passing Panga, a small village at which our conductors wished us to halt, although it was only six miles from Somnoo, we descended gradually to the river Teemboo, and continued along it for some time, during which we passed the remains of a suspension bridge. Leaving the rivers soon afterwards, we encountered such a long ascent that we did not reach Chupcha till rather late in the evening, most of the coolies remaining behind. Having surmounted the ridge immediately above Chupcha, and which is about 8600 feet in altitude, we descended very rapidly to the village, which is about 600 feet lower down the face of the mountain. The road was for the most part tolerably good; in one place it was built up along the face of a cliff overhanging the Teemboo. The scenery was throughout pretty, but especially before coming on the ascent: some of the views along the river were very picturesque.

* The first time I heard this bird was about Punukka. Although in plumage it differs a good deal from the bird so well known in Europe, yet its voice is precisely similar.

After leaving Panga no villages were passed, and one small one only was seen on the opposite bank of the Teemboo; but up to the above mentioned place the country continued tolerably populous. The vegetation, until the ascent was commenced, was a good deal like that about Somnoo, *Pinus excelsa* forming the predominant feature. From the base of the ascent it became completely changed—oaks forming the woods, and from 7500 feet upwards, various rhododendrons occurring in profusion, mixed with wild currants, &c. We were detained at Chupcha for two days, at the end of which the last coolies had scarcely arrived: it is ten miles from Somnoo, and sixteen miles from Panga, and about 8100 feet in elevation, The greatest ascent, and this too after a march of twelve miles, must have been between 2500 and 3000 feet. We were lodged comfortably in the castle, although it was not white-washed, nor had it the insignia of a belt of red ochre. It is a short distance from the village, which again is two or three hundred yards to the west of the direct road. We thought Chupcha a delightful place: the scenery is varied, the temperature delightful, varying in doors from 46° to 52°

The face of the mountain although very steep, is about the castle well cultivated: the crops which were of six ranked barley, were very luxuriant, and certainly the finest we ever saw in the country. The red-legged crow recurred here. During our stay, I ascended the ridge immediately above the castle, passing through a very large village of Gylongs, elevated at least 9000 feet. This village was the largest I saw in Bootan, and was ornamented with a pretty religious building, surrounded by junipers, and more decorated than such edifices usually are. Up to the village the path passed through beautiful woods of *Pinus excelsa*: above it I came on open sward, which continued on the south face up to the very summit of the ridge, which was nearly 11,000 feet. The north face of the mountain was well wooded: on it rhododendrons, a few black pines, beautiful clumps of *Pinus Smithiana*, Bogh Pat, Mountain Pears, Aconites, Columbines, Saxifrages, Primroses, &c. were found in abundance. The southern face was decorated with a pretty yellow Anemone, and the pink spikes of a Bistort. From the ridge still loftier ones were visible in every direction, all of which were covered with snow, which lightly sprinkled the one on which I stood. At this season snow scarcely remains for a day under 11,000 feet, except in very sheltered situations.

15th. I left Chupcha with much regret. We descended by a precipitous path to a torrent about 1800 feet below the castle. Crossing this, we descended gradually until we came on the ravine of the

Teemboo; at which point there is a small pagoda, visible from Chupcha. We then turned southwards, and continued for a long time at nearly the same level, passing a small village, Punugga, three or four hundred feet below us, and in which Capt. Turner had halted on his ascent. The descent to Chuka was long and gradual, becoming tolerably steep as we approached it. We reached the Teemboo by a miserable road, about half a mile from Chuka castle, which occupies a small eminence in what has once been the bed of the river.

The march was seventeen miles. The road in many places was very bad, and scarcely passable for loaded ponies. The scenery was frequently delightful, and vegetation was in the height of spring luxuriance. The hills bounding the ravine of Teemboo continued very high until we reached Chuka; they were well diversified, particularly at some height above us, with sward and glade, and richly ornamented with fine oaks, rhododendrons, cedar-like pines, and *Pinus excelsa*. Water was most abundant throughout the march, and in such places the vegetation was indescribably rich and luxuriant.

No village besides that of Punugga was passed or seen, nor did I observe any cultivation. I was much impeded by droves of cattle passing into the interior, for the road was frequently so narrow, and the mountains on which it was formed so steep, that I was obliged to wait quietly until all had passed. These cattle were of a different breed from those hitherto seen in Bootan, approaching in appearance the common cattle of the plains, than which however they were much finer and larger.

We were sufficiently well accommodated in the castle of Chuka, which is as bare of ornament as its neighbour of Chupcha; it is a place of some strength against forces unprovided with artillery, and commands the pass into the interior very completely. There is a miserable village near it, and several trees of the *Ficus elastica*.

16*th*. To Murichom. We descended to the Teemboo, which runs some fifty feet below the castle, and crossed it by a suspension bridge, of which a figure has been given by Capt. Turner; it is very inferior in size and construction to that of Rassgong, although, unlike that, it is flat at the bottom. We continued following the Teemboo winding gradually up its right bank, chiefly through rather heavy jungle, and descending subsequently about 600 feet to its bed by a dreadfully dangerous path, built up the face of a huge cliff. We continued along it until we crossed a small torrent at its junction with the large river, and then ascended gradually, following the ravine of this through humid jungle. As we approached Murichom we left the Teemboo a little to our left, and continued through a heavily

wooded country. Before ascending finally to Murichom, we descended twice to cross torrents. We reached Murichom late in the evening, the distance being eighteen miles.

No villages were seen until we came in sight of Murichom. The mountains were much decreased in height, and clothed with dense black jungle. We passed two water-falls, both on the left bank of the Teemboo, the one most to the south being the *Minza peeya* of Turner. Neither of them appeared particularly worthy of notice. The vegetation had almost completely changed, it partook largely of the sub-tropical characters, scarcely a single European form being met with. The road was absolutely villainous,* it was very narrow, frequently reduced to a mere ledge, and painful owing to the sharp projections of the limestone, the prevailing rock of this part of the country. Murichom is a small village, rather more than 4000 feet above the sea; the houses, which are about eight or ten in number, are thatched: it is prettily situated: there is a little cultivation of wheat and maize about it. Although at so considerable an elevation, most of the plants were similar to those of Assam.

17*th*. Leaving Murichom we descended rapidly to a small torrent, from which we re-ascended until we had regained the level of Murichom. The path then wound along through heavily wooded country at an elevation of 4000 or 4200 feet: we continued thus throughout the day. At 5 P. M. finding that the coolies were commencing to stop behind, and failing in getting any information of my companions, I returned about 1½ mile to the small village of Gygoogoo, which is about 300 feet below the path, and not visible from it. It is a miserable village of three or four bamboo huts. We had previously passed another and much better village, but as this was only six miles from Murichom, Capt. Pemberton determined to push on.

18*th*. I proceeded to Buxa. The path was somewhat improved, and the ascent gradual until an elevation of about 5500 feet was surmounted, from which the descent to Buxa is steep and uninterrupted. This place is seen from a ridge about 1200 feet above it. I reached it between 9 and 10 A. M., and found that my companions had arrived late on the preceding evening, having accomplished a march of twenty miles in one day. Scarcely any coolies had arrived, however, before me. The features of the country remained the same, the whole face being covered with dense black looking forest. Even on

* Such is the nature of the path from Chuka to the plains, although it is the great thoroughfare between both capitals and Rungpore, that either the trade of Bootan with that place must be much exaggerated, or some other road must exist between these two points.

the ridge, which must have been between 5000 and 5500 feet in elevation, scarcely any change took place. As I descended to Buxa vegetation became more and more tropical, and on reaching it found myself surrounded with plants common in many parts of the plains of Assam.*

Buxa is rather a pretty place, about 2000 feet above the sea. The only decent house in it is that of the Soobah, who is of inferior rank. The huts are of the ordinary description, and do not exceed twelve in number. The Soobah's house, with some of those of Bengal officers, occupy a low rising ground in the centre of the pass, which is divided from the hills on either side by a small torrent. A view of the plains is obtainable from this place.

Captain Pemberton left Buxa a day before me, as I was detained behind for coolies, none of whom had yet arrived. On the following day I rejoined him at Chicha-cotta. The descent to the plains is steep at first, and commences about a quarter of a mile from Buxa. On reaching the steep portion a halting place, called Minagoung, is passed, at which place, all bullocks, which are here used as beasts of burden, are relieved if bound to Buxa, or provided with burdens, if bound for the plains. The descent from this place is very gradual, and scarcely appreciable; the path was good, and bore appearances of being tolerably well frequented; it passed through a rather open forest, low grasses forming the under-plants. The plains were not reached for several miles, indeed the descent was so gradual, that the boundaries of the hills and those of the plains were but ill defined. At last however the usual Assam features of vast expanses of grassy vegetation, interrupted here and there with strips of jungle, presented themselves. The country is very low, entirely inundated during the rains, and almost uninhabited. Saul occurred toward that which may be considered the Toorai of these parts, but the trees were of no size.

Chicha-cotta is eighteen miles from Buxa, and is situated on a grassy plain; it is small and miserably stockaded, nor is there any appearance about the place indicative of comfort or security. To Koolta. We continued through nearly a desolate country, overrun with coarse grasses, until we came on the river, which is of considerable width, but fordable; we now found ourselves in the Cooch-Behar territory, and were much struck with the contrast between its richly cultivated state, and the absolute desolation of that belonging to Bootan. We continued traversing a highly fertile country, teeming with population,

* Plantains, jacks, mangoes, figs, oranges, &c., are found about the huts of Buxa.

until we reached those uncultivated portions of Assam, that are so frequent in the immediate vicinity of the Brahmaputra.

Our marches to Rangamutty were as follow :—

From Koolta to Bullumpore.

From Bullumpore to Kuldhooba.

From Kuldhooba to Burrumdungur.

From Burrumdungur to Rangamutty.

At Rangamutty, where we received every civility from the Bhoorawur, we took boat and arrived at Goalpara on the

Beyond this it is scarcely necessary to trace our progress. I have only to add, that but one death occurred during the time the Mission was absent.

(To be continued.)

Art. VI.—*Report on the Museum of the Asiatic Society.*

By Dr. Wm. Jameson.

[The subjoined very important Report on the state of our Museum, forms a part of the Proceedings of April, but we deem it well deserving of the earliest publicity. During the few weeks Dr. Jameson held the office of Curator, his exertions have accomplished more than could be readily believed, in reducing the chaotic materials of the Museum into systematic arrangement and disposition. His suggestions will doubtless receive the attentive consideration they are so strongly entitled to, and we trust before long that our Museum will be guaranteed from such reproaches as Mr. Jameson now too justly inflicts on it. His accomplished successor, Dr. M'Clelland, has all the skill and zeal essential for success, but the means at his disposal are manifestly too limited to enable him to execute all the measures his judgment would dictate. We anxiously hope that the naturalists of the Society will be excited by Dr. Jameson's Report to consider of the best and readiest means for the establishment of a Museum befitting the first Scientific Institution in the East. As our funds have been heavily drawn on this season for the erection of a new suite of apartments, to accommodate our growing collections, we think it would be worthy of those who feel the importance of such ennobling pursuits, to come forward with the means for furnishing our Museum with every essential appurtenance of the best and most

durable kind. We shall be happy to act as Trustees for a 'Museum Fund,' should our suggestions meet the approbation of those who understand and appreciate the object in view.—EDS.]

In reporting upon the present state of the collection of the Asiatic Society, we have felt much disinclination, fearing lest by so doing we might be considered as attacking the proceedings of our predecessors; we however consider it our duty, from the place we now hold, and the more so as we leave this in a few days for the Upper Provinces, trusting that when the statement has been laid before the Society, active measures will be taken to improve its condition.

We shall first notice the *Minerals* and *Rocks*. In these two departments the collection is exceedingly rich as far as numbers are concerned. Of the former there are upwards of two thousand specimens, and of the latter probably upwards of four thousand; but the miserable condition in which they have been kept—packed in drawers one above another, without paper, or any other material intervening—has rendered many of them entirely useless and unfit to be placed in the collection. In particular we would mention the *Zeolites*, many of which originally must have been magnificent. The *Apophyllites* (a species of zeolite) are very fine, and still valuable specimens, and had they not been so much destroyed, the Society might have claimed the merit of possessing, of this particular variety, the finest specimen, probably, in the world. Most of the other specimens have been equally neglected, and many of value destroyed. In regard to labels, there were but few attached, and of these many wrong. The *Rocks*, of which there is a most magnificent and extensive collection, would have been doubly valuable if they had been furnished with labels, indicating the locality from whence they had been obtained; at present after a collection containing every variety has been laid aside for the Society's own Museum, the others, when named, will form valuable duplicates for exchanging. To this department of the Society's Museum no attention whatever has been paid, although probably the most important. Lying beneath one of the tables in the Museum there was a large collection, said to be sent by Dr. Helfer, but as not one of the specimens was labelled, that is intimating where found, we have not been able to make use of them. In fact such a collection is quite useless to a Society; and even if some important mineral should be found in it, the value of the discovery could not be followed up. It would be of importance to intimate this to individuals engaged in making such collections.

Mammalia.—The collection of quadrupeds consists of about seventy specimens, many of which are exceedingly good, and a few very rare, among which we would characterise the *Hylobates albimanus*, *Hylobates hoolock*, *Ailurus refugens*, *Ictides albifrons*; but in this department the collection of the Society is very deficient, not containing above a fifth of the quadrupeds found in India. Moreover many specimens, from their bad condition, would require to be replaced as soon as possible.

Birds.—The number of birds prepared amount to upwards of six hundred specimens, and in addition to these there is a considerable collection in boxes, many specimens of which are not as yet in the Museum. Among the birds, there are some exceedingly rare and valuable specimens, and several new to science, which we shall now notice briefly. 1. *Larus kroicocephalus.* The discovery of this species is probably one of the most interesting which has been made in ornithology for some time. In size it is equal to the *Larus marinus* of Europe, and possesses in the head and neck colours

one of the principal characters essential to the genus *Kroicocephalus* of Eton, in every other character it is a true *Larus;* and as the colour of the head and neck disappear in winter, we have therefore this species representing in summer the genus *Kroicocephalus*, and in winter *Larus;* shewing the necessity of abandoning the former genus. The specimen in the Society's collection is partly in a state of change from the summer to the winter. In the Edinburgh Royal Museum there is another specimen in perfect summer plumage: these probably are the only two specimens known. The name we have adopted is one which we proposed to the Wernerian Society, being the generic one of Eton reduced to trivial value. Belonging to that interesting genus the *Leiothrix*, Swains. of which there is but one species described, there are two new species in the collection of the Society, in the Edinburgh Museum there is a third, and in the Zoological Society's Museum of London a fourth, all of which are peculiar to India, and thus the number of species is now increased to five, shewing the necessity and importance of making new genera, if the characters presented are sufficiently marked, although at first only one species should be presented. We could enumerate a large series of genera which were represented a few years ago by one species only, but which now contain from three to twelve species. In a bird lately laid before the Society by Dr. Evans, and considered by him as a variety of the *Aquila Chryractos*, the Society has a new species belonging to the genera *Haliaëtus;* the only other specimen we have seen is in the collection of the Zoological Society of London. We cannot omit mentioning the *Eurylaimus Dalhousiæ* as exceedingly rare and valuable species, three specimens only being known to exist in collections. Many other novelties, some of them extremely interesting in illustrating ornithological geography could be pointed out, which however would extend our report to an undue length; we however may state that Dr. Helfer has sent lately to the Society a new *Chalcites*, and *Irena puella*, and *Calyptomina viridis*, both of which were supposed to be confined to the Asiatic Islands.

Osteology.—The Osteological Department of the Society's collection is small, but still there are several splendid skeletons. The magnificence of the Fossil Osteological collection cannot be too strongly pointed out; but it is much and deeply to be regretted that there is no proper accommodation for it; which we hope will soon be remedied by proper cases being provided, and placed in the new apartments now building, in order that the many unique and valuable specimens may be properly exposed to view.

In regard to the *Icthyological, Erpetological, Conchological*, &c. departments of the Society we have not had any leisure to examine, and therefore forbear at present giving any report. But as there is much room for improvement in the departments we have already noticed, we beg to offer a few suggestions.

Minerals and Rocks.—Before the collections of Minerals and Rocks can be generally useful, there must be proper means for exhibitions, and we hope soon to see cases fitted up on the plan we proposed, or any other which may be suggested, furnished to the rooms. The advantages in having collections of Rocks and Minerals arranged and labelled properly, would no doubt be of the greatest consequence, seeing that it would form the basis for comparison of any collections which may hereafter reach the Museum; and also be of use to individuals for comparing their own private collections. As far as it lay in our power, during the short space of time we have had, we have arranged the Minerals in the tables formerly occupied by eggs, birds' heads, &c. only temporary however, expecting that more suitable cases will be provided. The Rocks are still lying

exposed for want of accommodation, but a few of them so arranged that when cases are provided, they can be removed by any individual.* The system we have followed is that of Werner, as improved by modern authors. If any member would now visit and see the extent of their Mineralogical collection, I am sure they would be convinced of the necessity of having proper cases.

The Bird cases since last Meeting have been fitted up with shelving, which has enabled us to arrange systematically the collection, and the system we have adopted is that of the Baron Cuvier. Moreover, in addition to the advantage derived in having a systematic arrangement, the cases will now contain three times as many specimens as they did formerly. To us it appears a most extraordinary idea, to suppose that objects of Natural History cannot be properly preserved in this country. No doubt in cases fitted up in the same manner as those of the Society at the present moment, they could not, either here or any where else; but if these cases were made air-tight, by lining the edges of the doors with chamois leather poisoned with arsenic, according to the plan adopted with the cases of many of the European collections, we would be bound to say, that the collections could be preserved nearly as well here as in Europe. At least this is a subject well worthy the attention of the Society.

In conclusion, we shall offer a few brief remarks in regard to the desiderata. To increase their collections, public bodies have generally adopted one plan, viz.—a memorial giving a brief account of the manner how to prepare, collect, and pack objects of Natural History, and at the same time pointing out those objects most to be desired. If such a memorial was got up under the auspices of this Society, and distributed among its numerous members and correspondents throughout India, the Society would not only possess for itself a collection in a very short time, but at the same time would have at its disposal, for making exchanges, a large series of duplicates; and in the space of a few years by so doing with the different collections in Europe, America, Cape, and Sydney, it would thus bring together, with little expense to itself, a collection which would vie with the various noble institutions on the European continent, and at the same time worthy of this the so-called City of Palaces. Before this can be done, a Catalogue of the collection must be made. Moreover the Society could in a series of tables exhibit by specimens, that is by bringing together the rocks of the different districts bordering on each other, the Geology of the whole of India, and thus in a manner supply that great desideratum, at least to individuals here, viz. the want of a Geological Map, and probably it might be the means of leading to this desirable object; an undertaking worthy of support from such an institution, and from the country at large.

W. J.

* Dr. M'Clelland informs us they have been once more swept into chaos by the unguarded hands of *assistants* since Mr. Jameson's departure. Nothing can more clearly prove the futility of attempting to do any thing in this department before proper cabinets are procured.—EDS.

Art. VII.—*Proceedings of the Asiatic Society.*

Wednesday Evening, 6th March, 1839.

At a Meeting held at the Grand Jury Room of the Supreme Court.

The Honorable Sir E. Ryan, President, in the chair.

The Proceedings of the last Meeting were read and confirmed.

The Honorable Sir H. Seton, the Rev. John Henry Pratt, Dr. William Jameson, Mr. E. Thomas, Mr. J. W. Laidlay, and Mr. A. C. Dunlop, proposed at the last Meeting, were ballotted for, and duly elected Members of the Society.

Read a letter from Mr. Charles Ritter, acknowledging his election as an honorary Member.

The Officiating Secretary apprized the Meeting of the departure of their Curator. Dr. George Evans, to Europe; and after some discussion it was resolved that Dr. William Jameson be appointed to the office, on the same allowances as those drawn by his predecessor.

Library.

Read a letter from H. T. Prinsep, Esq. forwarding for inspection Dr. Robert Wight's Illustrations of Indian Botany.

The following books were presented:—

Bulletin de la Societé de Geographie, vol. 9th—*by the Society.*

On the Ovulum of Santalum, by William Griffiths, Esq.—*by the Author.*

Die Stupa's (Topes) and die Colosse Von Bamiyan, by Carl Ritter—*by the Author.*

Journal of the Royal Asiatic Society, No. 9—*by the Society.*

Proceedings of the Bombay Geographical Society for August, 1838—*by the Society.*

Ditto of the American Philosophical Society, Nos. 1, 2, and 3, from January to August 1838—*by the Society.*

5 Copies Alif Leila, vol. 1st in Arabic—*subscribed for by the Society.*

Lardner's Cyclopædia—Literary and Scientific Men, vol. 9th—*from the Booksellers.*

Read an application from Premchaund Pundit, Editor of the "*Nyeshadha,*" regarding the 2nd part of the work in Manuscript, and offering to making over the same to the Society, on condition of his being remunerated for his trouble in compilation.

Resolved that the application be referred to the Committee of Papers.

Museum.

A Gumsoor Battle Axe was presented by Mr. J. G. Balmain.

Statistics.

Read a letter from H. H. Spry, Esq., Secretary to the Statistical Sub-Committee, intimating that in consequence of the Society's declining to publish the Documents compiled by them, they will no longer prosecute their researches.

The Annual Report for 1838, which had been presented on the 1st of January, was then read, and adopted by the Meeting.

Secretaries' Annual Report.

The indisposition and absence of the Rev. Mr. Malan since his appointment, and the short period during which we have held the office of Officiating-Secretaries, will we trust constitute a sufficient apology for the incompleteness of the present anniversary notice.

We have endeavoured by a diligent perusal of the proceedings of the year just elapsed to become familiar with the state and prospects of the Society, and we have also

sought more detailed information from the gentlemen severally responsible for the Library, Finance, and Museum departments.

On the general statistics of the Society we have to state that the accession of Members to the Society during the year 1838 was as follows:—

Ordinary Members,	....	25
Honorary Members,	....	1
Associate Members,	....	1

The loss of Members by deaths, departures to Europe, and withdrawals, has been —by departure to Europe, Messrs. W. ADAM, A COLVIN, H. WALTERS, Col. BURNEY, and Mr. JAMES PRINSEP. By withdrawals, Messrs. W. BRUCE and W. DENT.

By deaths in India, Messrs. A. E. DORBS and JOHN BELL, and in France Monsieur A JACQUET, an honorary Member, and one of the most distinguished Orientalists of the day.

We designedly forbear on this occasion from the attempt at any minute obituary notice of the Members whose deaths we so deeply lament. The decease of M. JACQUET was only announced at our last meeting. His friend and fellow labourer, EUGENE BURNOUF, in the letter which conveys this melancholy news, gives a touching narrative of the circumstances of M. JACQUET's malady and death. A victim to consumption, induced by his unremitting studies, he died at the age of 28, in the delusive confidence of revealing by his future labours much of what is still mysterious in the history and chronology of the Hindoo nations A quarter of an hour before death he was still ardently pursuing his studies. In the homage paid to his memory in France, the Asiatic Society of Bengal most unanimously and profoundly concur.

Publications.

We have to state that during the past year the 4th and last volume of the "*Mahabharata*" has been the only work printed in the Oriental department. The volume will be immediately published, and will cost the Society between 4 and 5,000 Rupees. The liberality of Government has most opportunely enabled the Society to meet from its own resources this heavy outlay, which otherwise would have fallen on our respected Secretary, Mr. PRINSEP. The sale of the work in France has unfortunately proved far short of M. BURNOUF's sanguine predictions.

The publication of the "*Sharira Vidaya,*" or translation of "Hooper's Anatomist's Vade Mecum," has been sanctioned by the Society in conjunction with Mr. MUIR, who has generously subscribed 1,000 Rupees for this special object. There is yet however much difficulty in this undertaking. The professional members of the Society consider the work wholly useless without plates, and the lowest estimate yet obtained places the cost of such illustrations at $6 \times 250 = 1{,}500$ Rupees. A reference to Europe was evidently expedient to procure cheaper and better cuts than are obtainable in India, and for the result of such reference the work is now postponed.

The publication of the "*Sharya-ul-Islam*" by the Newab TAHAWUR JUNG, has unfortunately been much retarded. The delay is attributable to the conjoint inactivity of the Printer and of the Moulavee employed to correct the proofs. Means are being taken however to accelerate the completion of the work. An advance of 800 Rupees has this month been made to the Printer, in pursuance of a resolution of the Committee of Papers and Finance.

The Transactions of the Society will soon be augmented by the publication of the 2nd Parts of the 19th and 20th Volumes. We may be pardoned for anticipating that the literary reputation of the Society will be well sustained in their pages. If the Society has been reproached with neglecting the Natural History of Asia, the part of the

Physical Researches now in the press, will, we are confident, more than remove that stigma. The bulk of the Physical Part will consist of Dr. M'CLELLAND's elaborate paper on "Indian *Cyprinidæ*."

In connexion with the subject of publications, we should not omit to notice two works by Members of the Society, to which Government has contributed either by subscription or by still more direct support. The first is the version by Mr. TORRENS of the ever-charming "*Alif Leila*." The second is the remarkable and valuable Cochin-Chinese Dictionary, by the Right Rev. the Bishop of Isauropolis, now Roman Catholic Bishop of the Diocese of Bengal.

Antiquities.

In antiquarian enterprise, research, and discovery, the past year has been most prolific. Among the events of interest we notice in our records, we may particularize the liberal grant by Government for the erection of the Allahabad pillar—the receipt from the Rev. Mr. WILSON of fac-similes of the Girnar inscriptions—Mr. PRINSEP's most important discovery of the name of ANTIOCHUS in two of the edicts of ASHOKA—Mr. PRINSEP's translation of the religious edicts of ASHOKA, discovered in Gujerat and in Cuttack—and the discovery that the inscription of Junegurh related the circumstance of the repair of a bridge in the time of CHUNDRA GUPTA, by ASHOKA, his grandson.

To these let us add, the interesting fruits of Mr. KITTOE's Researches in Cuttack—the active and successful measures adopted by Government to procure fac-similes of the Junegurh and Girnaghur inscriptions—the verification by Lieut. POSTANS of Mr. PRINSEP's views as to the reading of the name of ANTIGONUS next to that of PTOLEMY in the 14th edict, in the Girnar inscriptions—the measures taken by Government to prevent the demolition of the Kanarah Temple—and, lastly, Professor LASSEN's simultaneous proposition of an alphabet for the Pali and Bactrian languages, nearly identical with that described by Mr. PRINSEP in the July number of the Journal. On even this disjointed and hasty glance, we may well be proud of the progress the Society has accomplished in the fulfilment of one of the chief objects of its institution. It will, we doubt not, be universally admitted that the Asiatic Society during the past year has justified its high name, and retained its natural position, as the most energetic and successful agent of antiquarian discovery in the East.

Statistics.

Owing to the lamented deaths of Sir B. MALKIN and Mr. BELL, the retirement of Messrs. WALTERS and ADAM, and the withdrawal of Messrs. BIGNEL, CURNIN, and M'CLINTOCK, the Committee was at the end of the year 1838 reduced to four Members, Messrs. EWART, SPRY, BAILLIE, and STEWART. Mr. W. P. GRANT has since been elected a Member.

It is understood that Dr. STEWART has been for some time engaged in tabulating translations of the Records of Native Mortality in Calcutta, with the view to illustrate the localities of disease in this city, and the effects of climate on the health of its inhabitants. Dr. SPRY has prepared a series of tables illustrating the state of education among different classes of Society in Bengal. Mr. EWART has ready for press some very valuable original tables connected with the currency and trade of Calcutta. The only paper which has yet appeared in common with the labors of this Committee, is the very important document by Mr. H. T. PRINSEP, on the decrement of juvenile European life in Bengal. This valuable contribution to vital statistics has already appeared in the Society's Journal.

The Statistical Committee have met with the most willing and efficient support from the Government, and from the Parent Society. Access has been granted to all official records connected with the subjects of finance, commerce, education, and judicial administration. The Society has already contributed 500 Rs. to defray any expenses incurred by the Committee. High expectations are consequently entertained as to the harvest to be reaped from so fertile a field, by such active labourers, and under such warm and constant encouragement. The form best suited for the publication of the documents already prepared has excited considerable discussion, and still awaits a final decision.

Library.

The Librarian has been kind enough to comply with our request for a detailed report of the accessions to our collection during the last year, and he has classified the entire under the heads of languages and subjects. We now beg leave to present his report, by which it appears that we have received,

Publications in English,	..	117
in French, ..	..	31
in Latin, ..	..	3
in German, ..	..	5
in Dutch, ..	..	2
in Persian, ..	..	6
in Arabic, ..	..	4
in Turkish, ..	..	1
Total, ..		174 up to the period of Mr. Csoma's Report.

On the last day of the old year, we had the pleasure of receiving from M. CASSIN the highly important consignments exhibited on the table at the last meeting.

199 vols. 4to. and 8vo.

109 Pamphlets.

The works in question embrace some of the most important and valuable publications in every department of Natural History.

The mode in which this supply has been obtained is also very gratifying, the expense having been defrayed by the sale of our Oriental Publications in Paris. It is pleasing to observe this reciprocation of benefits by the cultivation of apparently opposite pursuits—We have exchanged the ancient lore of the East, for the most modern and useful sciences of Europe. Each branch of our labors thus proves auxiliary to the other. The researches of the naturalist are promoted by the discoveries of the philologist and antiquarian, and thus, each in our particular sphere, we sustain the reputation and enhance the utility of a Society established for the universal purpose of investigating "whatever is performed by man or produced by nature" in the East.

Museum of Natural History.

Mr. EVANS has sent in an Annual Report, which will be published separately for your information.

Miscellaneous.

During the past year some miscellaneous passages in our history deserve to be recorded in our annual notice.

In January we had the gratification of witnessing the erection in our apartments of the bust of our distinguished associate, Professor WILSON. The feeling excited on

this occasion, led on the following month to the adoption of measures, by which w forward to an early installation of the like remembrances of Sir Wm. Jones, C Colebrooke, and Dr. Mill. This is indeed an object worthy of a grateful an Society, and must excite in the present Members the ambition of ultimately des such inestimable rewards.

In February a despatch was received from the Court of Directors, ordering 40 of each number of the Society's Journal—an act of generous patronage mos bestowed on the periodical, as it was then conducted. It was moreover but the runner of still greater munificence, in the grant authorized in September of 500 R per mensem for the encouragement of Oriental Publications.

Nor while we acknowledge this princely aid from Government, should we be on the liberality of some individual benefactors. Among these, Mr. Muir stand eminent—his subscription of 1000 Rupees to the expenses of the "*Sharira Vidaya*" we trust ere long be instrumental in placing a practical work on Anatomy within the of the hereditary physicians of the East. Another act of warm co-operation, a have done. Let us commemorate the readiness with which Mr. James Prinse tained, by an outlay of 6,000 Rupees, the publication of the "*Mahabharata*," would otherwise have necessarily been discontinued. For this we are fortunate abled to indemnify Mr. Prinsep, but he is not the less entitled to this grateful of his unrivalled liberality.

In conclusion of this very imperfect Report, we should have dwelt in due a served detail on the vast loss we have experienced in Mr. Prinsep's depart Europe, had not the subject been so fully and recently before the Society so perfectly dealt with in the President's address. We have now only to e our earnest hopes that in full health and spirit Mr. Prinsep may soon return scenes of his brilliant and numerous triumphs. His absence must not however a ther nullify the movement he excited. It seems to us too that the best proof, esteem and affection in which we hold him, will be the perseverance in his pursuit in the support of his Journal, until his presence enables the Society to enjoy the advantage of his inestimable labours.

(Signed) J. C. C. SUTHERLAND,
W. B. O'SHAUGHNESSY, M. D
Acting Secret

JOURNAL

OF

THE ASIATIC SOCIETY.

No. 88.—APRIL, 1839.

ART. I.—*Journal of the Mission which visited Bootan, in* 1837-38, *under Captain* R. BOILEAU PEMBERTON. *By* W. GRIFFITH, ESQ. *Madras Medical Establishment.*

(Continued from page 241.)

PART II.

[*Remarks on the nature of the country, especially its vegetation, boundaries, and divisions—its government, population, sects, character, customs, manners, and diet—political relations.*]

The following remarks suggested themselves to me during the bird's eye view I had of Bootan; their superficiality is only to be excused by the shortness of my stay, the want of proper interpreters, the jealousy of the Booteas, and extreme mendacity of such of their Bengal subjects from whom, in my total ignorance of the Bootea language, information was alone to be expected. And as I had daily opportunities of seeing the constancy with which the head of the Mission amassed all available information, I contented myself with remarking on external rather than internal objects, on the face of nature, rather than on that of men. Bootan, I need scarcely observe, is a mountainous country, forming a considerable part of the most magnificent chain of mountains in the universe; in it are to be found all degrees of elevation, from 1000 to 25,000 feet. In its extent it is rather more limited than was supposed, since Capt. Pemberton has ascertained that the country to the eastward, which is ruled by the Towang Rajah, is directly dependent on, and forms a portion of the Lhassa government.

The boundaries of the country are, Thibet to the north; the plains of Assam and Bengal to the south; Sikkim to the west; and the Kampa country to the east. Its greatest breadth will hence be about 90, and its greatest length about 210 miles.

The physical aspect of this country, so far as regards its most essential point—mountains, presents perhaps but little deviation from that of other parts of the Great Himalayan chain; but on this point I am unable to give any information. Every variety of surface was met with, from bluff-headed to peaked highly angular summits. In some places the paths were built up the naked faces of precipices; in others, very considerable elevations might be attained by very gradual ascents, over a sufficiently practicable country. The two most rugged and most peaked were, as might be expected, the two highest—Dongdola and Rodola: the others, which generally averaged 10,500 feet, were very easy. Of the rivers, which are in all cases mere mountain torrents, nothing need be said. The largest we saw was the Monass, which forms the principal drain of the eastern portion of Bootan. No lakes appear to occur: there is below Santagong a jheel of small extent, but it is of no depth, and does not derive its presence from springs or the embouchure of small tributaries. It abounded with water fowl, and was choked up with sedges, and a plant belonging to the family *Hydropeltidæ*, hitherto not, I believe, found in India. Neither is Bootan a country of valleys; in fact, with the exception of those of Bhoomlungtung, Byagur, and Jaisa, we saw none worthy of bearing the name. That of Punukka owes its existence to the vagaries of the river, as its only level part has obviously at some previous time formed part of its bed. The three valleys otherwise mentioned are, if viewed in comparison with other valleys situated in similarly mountainous countries, perfectly insignificant, for they consist of a gentle slope from the bases of the contiguous hills to the bed of the draining stream. The valley of Tassisudon is probably of like extent with that of Punukka, but Turner's accounts are so little to be relied on, that even in a simple matter like this no just conclusion is to be formed. I have only to add, that the three valleys are represented as being close to some of the passes into Thibet: this alone is perhaps sufficient to account for their great elevation.

Hot springs occur one day's journey from Punukka, and appear to be the resort of many invalids, victims to the most frequent disease, lues venerea. From specimens procured by our guide, Chillong Soubah, there must be at least two springs; of one the water is of a yellowish tint, and highly sulphureous; that of the other is limpid, and possesses no sensible properties. I did not hear of the existence of such springs elsewhere.

Of the climate, which is necessarily so varied, it would be useless to attempt to give an account; indeed the only two places of the climate of which the mean could be given for even one month, are Tongsa and Punukka. The mean for the month of March at Tongsa may be estimated at 56° 3′, the maximum heat between the 6th and 21st instant being 63°, and the minimum 51°. I have elsewhere stated the results of the observations made at Punukka. Throughout the barren portions of the country, which are so generally limited to inconsiderable elevations, the heat must no doubt be great during the summer months; at Punukka in April the sun was found very incommoding after 9 A. M; and as a proof of the heat at such elevations as 7000 feet in some places, I may readvert to the culture of rice at, and above Tongsa. The ravines are, however, very narrow about this place, and the faces of the mountain on which the cultivation occurred had a western aspect.

In very many places, however, more abstracted from the influence of radiated heat, delightful climates may be found. It is curious, though not singular, that the best situations were always found occupied by Gylong villages. Considerable elevation is, in addition to other minor causes, requisite at least for a Bootea, during the summer months: thus the Gylong villages were rarely seen under 8000 feet, and oftener about 9000 feet; and the chiefs find a summer change of residence necessary, during which they repair to elevations varying from 7000 to 9000 feet.

The change in the Deb's residence from Punukka to Tassisudon in the summer, and vice versa in the winter, is to be accounted for, especially the latter change, on principles of equalization; that is, the ryots about the one place are obstinate enough to refuse supplies for more than six months; such at least was the story heard by us, although it is rendered doubtful, by the total want of regard evinced by the rulers of the land for the interest of their subjects. The most delightful climate we experienced was that of May at Chupcha, which is situated on the steep face of a mountain with a south west aspect, yet the temperature ranged from 46° to 51°. A week afterwards, and we were exposed to the unmitigated fierceness of a Bengal sun at the hottest time of the year.

The most disagreeable part of the climate of Bootan exists in the violence of the winds, more particularly in the valleys. The direction of these winds, which are very gusty, is invariably up the ravines, or contrary to the course of the draining-torrents, no matter what direction these may have; the winds therefore are dependent upon local circumstances, as might be expected from the dryness of the

soil, and its effects on vegetation. The winds are more violent throughout the lower tracts than elsewhere, and as in many of these places they are enabled to supply themselves with dust, they often became very positively disagreeable, and formed no inconsiderable part of the annoyances we were subjected to during our residence at Punukka. These partial winds* are frequently so violent as to unroof the houses; it must be remembered, however, that the roofs are generally mere shingles, kept in their places by large stones. During our stay at Punukka, the regal or sacred part of the roof was blown off; the clattering that ensued from the falling of the copper plates, mixed with the noise of the shingles and stones of other parts of the palace, was very great; a deputation was immediately sent from the palace to request that we would fire off no more guns near the palace, and we found out afterwards that we were looked upon with a very suspicious eye.

We were not much incommoded with rain, neither should I consider it to be abundant throughout the lower elevations, at least no part of the vegetation I saw in such tracts seemed to indicate even a small amount of moisture. We were only once delayed by snow, and on our return enjoyed uninterrupted fine weather until we reached Buxa, where, as might be expected from its proximity to the plains and the season, the weather was unsettled.

As regards quantity of vegetation, Bootan exhibits, it appears to me, considerable peculiarities. In the other parts of the Himalayan chain I have seen, and generally throughout India, the bases and lower portions of the mountains are the most thickly wooded, and it is generally a tolerably certain indication of elevation when less wooded tracts are met with; but in Bootan not only is the vegetation of the lower ranges contiguous to the plains unusually scanty throughout a considerable part of their extent, but throughout the interior it is generally absolutely barren within certain elevations. This scantiness at the base of the mountains is perhaps at its maximum due north from Gowahatti, in which direction the vegetation is almost entirely gramineous; to the westward it certainly lessens, but even to the north of Rungpore (Bengal) the woods are thin, especially when contrasted with the Toorais of other portions; at the same time the vegetation of the lower ranges is in this direction nearly as dense as it is elsewhere. Of its extent to the eastward I have no actual evidence to offer; but as to the north of Jeypore there is a well defined Toorai, and

* The general winds have, it would appear, the usual direction; that is, they blow from the plains.

as to the eastward again, it would appear to *again* become deficient: it probably is irregular in its distribution, and depends consequently on local causes.

But while there is such difference in the amount of vegetation along the tract at the base of the mountains, the vegetation on these up to an elevation of 1600—3500 feet is uniformly scanty, except to the westward, in which direction, as I have mentioned, they do not differ in absolute amount from the well wooded mountains to be seen elsewhere.

Between Dewangiri and Punukka we found that the surface of the interior below 5000 feet in elevation was uniformly very barren, and after crossing the ridge above Telagoung we found similar appearances, but with a very dissimilar vegetation, at elevations of from 7000 to 11,000 feet, but they were by no means so uniform or so general. Throughout the barren tracts* of the first of the above portions of Bootan the vegetation consists for the most part of grasses, among which a few low shrubs occur. The arboreous vegetation is confined almost entirely to *Pinus longifolia*, which is very commonly much stunted. The barren tracts to the westward of Telagoung were remarked almost entirely along the Teemboo, the southern face of the ravine of which was generally remarkably barren, even at very considerable elevations. Grasses did not form here so predominant a portion, shrubs on the contrary abounded, and among these the most common perhaps was a species of *Rosa*, very much like the *R sericea* of Royle's Illustrations.

In Bootan it is only at high elevations, and under certain circumstances, among which aspect and especially humidity are the most important, that the grand forests which have excited the admiration of all travellers in the Himalayas to the westward, make their appearance. The requisite elevation is scarcely ever less than 7000, and is generally about 8000—8500 feet; at such, oaks, magnolias, rhododendrons, and several species of firs attain to great perfection. Between, or on the borders of the woods, patches of swards, adorned in the spring with beautiful herbaceous plants are frequently met with, and form the prettiest object in the whole scenery of Bootan. The vegetation of such, and of much higher elevations, is generally well diversified, until indeed one reaches an elevation of 11,500 feet; at such I found it generally reduced to black firs, stunted junipers, and shrubby rhododendrons, the bulk, as regards amount of species,

* These lower mountains are very frequently curiously marked with transverse ridges. These have much of the appearance of ancient terrace cultivation, but on inquiry I was assured that such was not their origin.

consisting of herbaceous plants, whose growth is confined to a very few congenial months, and which were almost all hid from my view by the heavy snow, so constant between the latter end of October and the commencement of May. Another striking feature in Bootan is the constancy with which southern faces of mountains are, especially towards their summits, bare of trees or shrubs; this it has in common with other parts of the Himalayas both to the westward, where it has struck all travellers, and to the eastward, as on the Mishmees. I am not prepared to state whether any satisfactory explanation of this has been given; it struck me to be due, in Bootan at least, to the searching severity of the winds, which are quite sufficient to keep down all luxuriance of vegetation. Whatever the secondary causes may be, there can be no doubt that the primary one is due to the influence of the south-west monsoon, to which all these faces of the Himalayan mountains are freely exposed.

The higher the altitude the greater, as indeed might be expected, was the uniformity of vegetation, and it was only in such that any general features of vegetation could be said to occur. A very constant feature of high altitude, such as from 11,000 to 12,500 feet, existed in the black fir, a lofty tabularly-branched tree of a very peculiar appearance, in comparison at least with other Bootan species, and which, when seen standing out in dark relief, might, from the very frequent mutilation of its lower branches, be mistaken at a distance for palm; with these there was as nearly a constant association of the same species of other plants. The most striking among the partial features of the vegetation of Bootan was presented to us by the three valleys, so often alluded to; these may well be called the region of pines of that country. The range of the three species was most distinct and very instructive, although the Smithian Pine, a little further to the westward, descended to a somewhat lower elevation than it did in the tract above mentioned.

Still more partial features were presented by the *Pinus excelsa*, and more especially by the *Pinus longifolia*, the distribution of both of which appears to depend on local causes. The latter species was not seen on our return, nor was there a vestige of a fir visible after reaching Chuka; no species but the long-leaved was seen below 5500 feet.

I have in the foregoing few remarks merely glanced at the most familiar features of the botany of Bootan. As the importance of strict determination has been much insisted on before correct views can be formed of the botanical geography of any country, I have purposely omitted all details, until the collection shall have been duly examined; but even when this has been done, the difficulties are almost insuper-

able, for although Roxburgh died thirty four years ago, and the number of plants indigenous to India has been increased fourfold since that time, the means exist of determining but a very few more than those described by Roxburgh himself. It is familiar to all botanists that of the 8000 species distributed eight or ten years since by the Honorable Company, not more than 1000 have yet received their promised share of elaboration.*

Bootan is divided into provinces which are ruled by Pillos, of whom there are three—the Paro, Tongsa, and Tacca: they derive their names from their respective residences; the rank of the two first is, I believe, equal, and they are admitted into council, while that of Tacca Pillo is very inferior.

The provinces are again divided into districts, equivalent to Soubahships; of these there are several. The Soobah's jurisdictions through which we passed were those of Dewangiri, Tassgong, Tassangsee, Lenglung, and Byagur, all of which are in Tongsa Pillo's province. After leaving Tongsa we came into the province of Punukka, and after leaving this capital we came on the tract attached to that of Tassisudon, or as it is called Tassjeung. The Soobahs all exercise supreme jurisdiction within their own limits, but pay a certain annual amount of revenue to their respective Pillos. The Soobahs of Dewangiri and Buxa are of subordinate rank.

But besides these governors of provinces, and governors of districts, there are other officers of high rank, who assist in moving the machine of government; they do not however make good exemplifications of the proverb, "in the multitude of counsellors there is wisdom." The offices of these additional counsellors are as follow—the Tass Troompoon, or warder of the palace of Tassisudon; the Puna Troompoon of the palace of Punukka; and Wandipore Troompoon of the castle of Wandipore; then there is the Lam Trimpe on the part of the Dhurma, and Deb Trimpe on the part of the Deb.

* The following passage was erased from the proof of Dr. Griffith's M.S. in the office of the Secretary to Government. We insert it as a note, on Dr. Griffith's and our own responsibility, and in the confidence that Dr. Wallich can readily give a full and a satisfactory answer to the implied charges.—Eds.

"Had Dr. Wallich never been in India the matter would have been otherwise, as it would not then have been a matter of policy to remove every vestige of an Herbarium from the Botanic Gardens, and to publish a confused catalogue of names without characters. As the matter now stands, Indian botanists are reduced to this,—they must either give up all the advantages they possess by being in India, and wait until all the species, amounting to 3 or 4,000, named by Dr. Wallich have been described by others in Europe from dried, and in many cases very imperfect specimens, or they must in no case acknowledge the authority of any body to name an object without giving it a character, and publish such new species as they may deem to be new with their names and their descriptions."

The supreme authorities are the Dhurma and Deb Rajahs; the latter representing the temporal government in its strictest sense, as his reign is generally short; the former the spiritual in as strict a sense, for he is, although infinitely divisible, quite eternal. The immortality of the Dhurma is not so well known as that of the Lama of Thibet, it is nevertheless equally true; both appear to have been firmly believed by Captain Turner, whose account of the behaviour and intelligence of the Grand Lama, an infant of some months old, is very amusing and characteristic. The present Dhurma is, as I have mentioned, the son of Tongsa Pillo, a curious coincidence.

The chief test of the authenticity of the infant in whom the Dhurma condescends to leave the regions of æther for those of gross spirits, consists in his recognising his former articles of wearing apparel, &c.; and to avoid any supposition that might arise from the probability of any mortal child being struck with shewy gew-gaws, this child is bound to assert that they are actually his own; if it does so, surely it is satisfactory evidence. The infant Dhurma may as well be found in the hut of the poorest peasant as in the residence of an officer of high rank, but I dare say, if the truth were known, he is usually made for the occasion.

When he has been completely tested he is removed to the palace, and his life thenceforward becomes one of almost absolute seclusion. Surrounded by hosts of priests, and in the apparent enjoyment of most things deemed desirable by a Bootea, he is nothing but a state prisoner, virtually sacrificed to state ordinances. Neither is it probable that he enjoys any power sufficient to recompense him for being cut off from the merry side of life, for if his teachers have been wise teachers, they probably rule him throughout. But all this holds good only on the supposition that his life is as really monastically rigid as those of some orders of Christian monks were not. We heard strange accounts, especially at Punukka, sufficient to suggest that a priest is not necessarily virtuous in Bootan more than any where else.

His revenues are, I believe, derived from certain lands in the plains, and above all from offerings. He is also said to trade, but none of them can derive much profit from commercial speculations.

It is in the Deb that the supreme authority as regards the internal economy of the country is vested. But supreme though he be called, as he can do nothing without consulting all the counsellors, including the Pillos, who have no cause to dread his displeasure, his power must be extremely limited, and very often disputed; and, if it is remembered that he is always checked by those counsellors who are actually present with him, and that he holds no, or at least very little, territory

on the plains; and that a Pillo has no check on himself, that his province is perhaps remote from the capital, and that he has filled up all his offices with his own relations and friends, it is evident, I think, that the change from governor of a province to that of supreme ruler of the country must be attended with loss of power. Besides, the Deb is only expected to retain office for three years, at the end of which he is expected to retire, provided he be weak enough.

The present Deb, if indeed he now exists, has no authority out of Punukka, and not too much even in his own palace. He was formerly Tacca Pillo, and this seemed to be the grand source of complaint against him.

The chief object of the Deb, as is that of all his officers, is to accumulate money. The sources of this are plunder, fines, reversion of property to him by death of the owners (and this seems to be carried to a frightful extent), tributes from the Pillos, offerings on accepting office, trading, and the proceeds of lands in the plains; but this last source cannot yield much, since the occupation of the best part by Herr Govindh. Our Deb, in addition to his usual sources, added another during our visit, by robbing the Dhurma of all his presents. The revenues of the Pillos are derived principally from their Dooars, or territories in the plains, by plunder either of their own subjects, or those of the British government, fines, in short by every possible method.

Nothing can be said in favour of this many-headed government; each Deb, each Pillo, each Soobah, each officer in fact of high or low degree, is obstinately bent on enriching himself at the expense of his subjects or his inferiors; and their object is to do this as rapidly as possible, as removals are always probable, and are almost sure to depend upon a change of the Deb. There is no security for property, and not much for life, but fines are fortunately deemed more profitable than bloodshed, and, in short, the only safety of the lower orders consists in their extreme poverty. The whole proceedings of this government with the Mission were characterised by utter want of faith, honesty, and consideration. The trickery, intrigue, and falsehood could only be equalled by the supreme ignorance, presumption, and folly exhibited upon every occasion. Procrastination was a trump card in the game they played, mildness of deportment was pretty sure of inducing insolence, and they were only kept in decent order by perceiving that you were determined not to be trifled with.

I am not disposed to assign their behaviour to the nature of the present temporary government; it was only natural in an ignorant, very conceited people, who find that they are treated with distinguished consideration by the only power that admits them to an equality. The

preceding Deb, from convictions of interest, and from having tasted more than once of British liberality, might have treated the Mission with some consideration, but the issue as to business would doubtless have been the same. I regret much not being able to state more about the government of the country, and more especially its internal economy. The usual punishment for crimes is in fines, a method always resorted to wherever money is considered as the grand object. In Bootan I have little doubt but that the commission of grievous crimes would be encouraged, were the lower orders in condition to pay the fines.

I have before adverted to an instance of black treachery: that instance was furnished by a Mahomedan, Nuzeeb-ood Deen, a native of Calcutta; who having accompanied a trader into Bootan had been detained and placed in a state of captivity for twelve years. By some fortunate neglect on the part of the Booteas in the palace, he contrived to gain admission to Capt. Pemberton; and his tale was so consistent, and bore such evidences of truth, that Capt. Pemberton claimed him as a British subject; and the justice of the claim was very strongly urged by the prevarication of the Booteas, who indeed finally admitted it. Nuzeeb-ood Deen returned to the palace, but very luckily for him, Capt. Pemberton, who suspected that the Booteas might dispose of him privily, insisted much that he should be forthcoming when he called for him, and wrote to the Deb to the same purpose; yet even under these circumstances, it was unanimously agreed that he should be cut to pieces and thrown into the river, but they refrained from doing so from fear of the consequences. As soon as he was given up, which happened a day or two before our departure, he placed himself under Captain Pemberton, who advised him not to associate with Booteas, and above all to eat or drink nothing from their hands. Nuzeeb-ood Deen however was not proof against a cup presented to him by a boy with whom he had been very intimate during his captivity. The consequences were every symptom of having partaken of some narcotic poison; he was saved by the action of powerful emetics, but did not recover for some time afterwards; he was carried through the palace and throughout the first march on a Bootea's back.

The *population* of the country is certainly scanty, and indeed could not be otherwise under existing circumstances. Villages are very generally "few and far between," in addition to their being small. The only decently populated bits of country we saw about Santagong and Tamashoo. The valley of the Teemboo as far as Panga was also tolerably populous, but it must be remembered that this is the principal part of the great thoroughfare of the country. The palaces and

castles are the only places well inhabited, but the inmates might very advantageously be dispensed with, as they consist of idle priests in excess, and bullying followers; both too happy to live at the expense of the poor cultivators.

The causes of this scantiness of the population exist in polyandry, and one of its opposites *agyny*, in the bad government, and the filthy and licentious habits of the people. The great rarity of aged people struck us all very forcibly, and is a proof that whatever may be the proportion of births, the proportion of life is below average. The bad influence of polyandry is supposed to be counteracted by the idea, that the spouse of many will be faithful to the eldest so long as he may be present, and after him to the second, and so on;—such an idea is at best absurd, and as regards Bootan women, is positively ridiculous, their chastity not being of such a quality as to induce them to be particular as to relationship, or even acquaintance.

The expected celibacy of so large a portion of the inhabitants, although probably assumed in some degree, and which depends either on acceptance of office or on the course of education, must be very pernicious. The large number thus withdrawn from propagating—the only good in their power—would lead us to suppose that polygamy would be of much more likely occurrence than polyandry; and the custom is rendered still more paradoxical by the contrariety of custom observed amongst most other Asiatic people, who make polygamy almost an invariable consequence of worldly prosperity.

In very many places there is obviously an extreme disproportion of females to males, yet it would be too much to assume that there is a general disproportion, although the two causes above adverted to be would sanction such a belief, unnatural as it may supposed to be. We could not ascertain that the apparent disproportion of females was the result of unnatural conduct on the part of the Booteas, although in my opinion they are sufficiently capable of destroying either male or female offspring, did they consider it expedient to their interests.

Of the diseases, which in all countries form so essential a part of the causes tending to diminish population, I know nothing. The few patients I had at Punukka were all suffering from venereal, frequently in its worst form. Chillong Soobah assured me that such cases occur in the proportion of one in five.

The number of half-ruined villages would suggest the idea that the population was formerly more extensive than it now is. But it must be remembered that, in this as well as most other hilly parts of India, the population is partly migratory. In a country where agriculture is not understood, where no natural means exist for renovating the soil,

and no artificial ones are employed, the population must vary their abodes in accordance with means of subsistence. The only cause for surprise is that they should build such substantial houses; they may do so with a view of returning to them after the ground has been sufficiently fallowed.

Education. Of the course of this essence of the growth of the mind I can state nothing. If the assumption of the habits of priesthood be considered as the first step of education, it is rather extensive; but I doubt whether a Bootea boy may not wear these robes for years and then throw them off improved in no good, but in all vice. There is scarcely a village in Bootan in which some exterior decorations, as well as the whole air of the house, do not indicate it to be the favoured residence of a priest; yet I never heard the hum of scholars in any other place than Dewangiri, in which, and it is a curious coincidence, priests were comparatively uncommon.

The Booteas appear to have no caste; they are divided, however, into several sects, and in the account of the Persian sent into Bootan by Mr. Scott, whose account may be found in the fifteenth volume of the Asiatic Researches, as many as fifteen are enumerated. It does not appear, however, that the possession of the higher offices is confined to the higher sects; for Tongsa Pillo is known to be a man of a low sect, although he may be considered, from his station and connexions, the most powerful man in the country.

Most Booteas have much of the same appearance; to this however the people about Bhoomlungtung, Byagur, and Jaisa, as well as those about Rydang are marked exceptions, and have much more of what I imagine to be the Tartar appearance.*

If we look at those sects which do not depend upon blood, but upon education or circumstances, we may divide the inhabitants into labourers, priests, idle retainers, and great men, which is in many places another word for tyrants. The labourers are better acquainted with poverty than any thing else, and are lucky in being allowed to have such a safeguard.

Perhaps the most numerous, and certainly the most pernicious class, is that of the Priests or Gylongs. Their number is really astonishing, particularly when compared with the population in general. Not only do they swarm in the castles and palaces, of which they occupy the best and most exalted parts, but they inhabit whole villages, which may be always recognised by the houses being somewhat white-washed, of a better than ordinary description, and always in the best and

* The people again towards Buxa are of very distinct appearance, but this results from a tolerably free admixture of Bengalee blood.

coolest situations. Of their grades of rank I can say nothing, but much importance seems to depend upon due agedness. The highest were usually admitted to the interviews, and of course expected to be recompensed for the honour they did us; but as they were well contented with two or three rupees, their ideas cannot be said to be extravagant. They are perhaps rather more cleanly than other Booteas, and are reported to bathe publicly every week; but although we frequently saw processions in single files, in all cases headed by a small drum, a sort of gong, a clarionet, and an incense bearer, the priests following according to their seniority, the youngest noviciate ending the tail, I am not convinced but that the bathing part may be more nominal than actual; one thing at least is certain, that the duty, whatever it was, was agreeable, otherwise we should not have seen the processions so often.

They are kept in order in the castles by hide whips, in the use of which some of the brethren are neither sparing nor discriminating. The dress is becoming, consisting of a sleeveless tunic, generally of a chocolate colour, and edged with black or yellow. They are certainly better off than any other class: their chief duty is to be idle, to feast at the expense of the country, and at most, to tell their beads and recite mutterings.

The idle retainers form also a large portion, though by no means equal to that of the priests. As little can be said in the favour of these as in that of those, but they have one disadvantage in not being able to make use of their religion as a cloak for evil deeds. In these two classes all the most able-bodied men in the country are absorbed: they are taught to be idle and to become oppressors, and what is very bad in such a thinly populated country, they learn to look upon the ordinance of marriage, and its usual consequences, as a bar to their own interest. Of the great men I can only say that their influence is undeviatingly directed to the furtherance of their interests; they become governors to oppress, not to protect the governed—they rule by misrule; and as being the sources of the two great evils I have just mentioned—priests and retainers—they are themselves the greatest curse that ever was inflicted upon a poor country.

Of the moral qualities of the Booteas it is not in my power to give a pleasing account. To the lower orders I am disposed to give credit for much cheerfulness, even under their most depressed circumstances, and generally for considerable honesty. The only instances of theft that occurred did so on our approach to the Capital. How strange, that where all that should be good, and all that is great is congregated, there is little to be found but sheer vice; and how strange, that

where good examples alone should be led, bad examples alone are followed.

To the higher orders I cannot attribute the possession of a single good quality. They are utter strangers to truth, they are greedy beggars, they are wholly familiar with rapacity and craftiness, and the will of working evil. This censure applies only to those with whom we had personal intercourse; it would be perhaps unfair to include the Soobahs, whom we only saw once, in such a flattering picture, but it certainly would not be unreasonable; and I must make one exception in favour of Bullumboo, the Soobah of Dewangiri, and he was the only man of any rank that we had reason to be friendly towards and to respect. In morale they appeared to me to be inferior to all ordinary Hill tribes, on whom a Bootea would look with ineffable contempt; and although their houses are generally better, and although they actually have castles and places called palaces, and although the elders of the land dress in fine cloths and gaudy silks, and possess money, ponies, mules, and slaves, I am disposed to consider them as inferior even to the naked Naga.

They are not even courageous. I am inclined to rank courage among physical rather than moral qualities, yet it could not so be classified in the consideration of a Bootea, in whom other physical qualities are well developed. I therefore consider it among those other qualities which, as I have said, are absent in Bootan. A Bootea is a great boaster, but a small performer. All the accounts I heard of their reputed courage were ludicrous. Turner mentions seriously that one desperate revolution superinduced the death of one man in battle; and we were told that in the late protracted one, the only sufferers were two sick people who were unable to escape from a burning house. In a military point of view they could only make up for their deficiency in numbers by an excess of courage and of perseverance under difficulties. They are not even well versed in the use of their national weapons. The Gourkha Soubahdar who accompanied the Mission looked on them with the utmost contempt, and this knowledge he had gained by long experience. In Mr. Scott's time a handful of Assamese sebundies would take stronghold after stronghold, and lead off all the tenants, excepting the defenders who had run away, as captives; and very lately 700 Booteas, with every advantage of ground, were totally routed by seventy of the same sebundies. Their courage may therefore be written down as entirely imaginary.

Their ideas of religion appear to be very confused; religion with them consisting, as indeed it may do among other more civilised people, of certain external forms, such as counting beads, and mutter-

ing sacred sentences. The people throughout are remarkably superstitious, believing in an innumerable host of spirits, whose residences they dare not pass on horseback; and while they are near these abodes they keep the tenant at bay with vollies of incantations. The offerings to these spirits are usually flowers, or bits of rag; this practice they have in common with most of the tribes to the extreme east of Assam.

Of any marriage ceremonies I could not hear; but as chastity would appear to be unknown, no particular forms are probably required; nor do I think that there is a particular class of prostitutes. We all had opportunities of remarking the gross indelicacy of Bootea women; of this and of their extreme amiableness, the custom of polyandry is a very sufficient cause. So far as I could see, there is no distinction of rank among Bootea women, and those only are saved from the performance of menial duties who are incapacitated by sickness or age.

If the account given by Mr. Scott's Persian of the ceremonies attendant on birth be true, another sufficient cause exists for scantiness of population, as well as for a disproportion of women. He asserts that the second day after birth both child and mother are plunged into the nearest river; but so great is the dislike of a Bootea for this element, that I am inclined to discredit the account, and more especially as regards the mother.

The disposal of corpses is much the same as among the Hindoos: the ashes of the body are collected, and are, I believe, thrown into the nearest river. The ceremonies, of course, begin and end with a donation to the officiating priest. The only part of them I witnessed was the burning, and this only in one instance; it was done in a slovenly and disgusting manner.

Of the social habits, little favourable could be said in any place where the women are looked on as inferior beings, and used as slaves. The men generally are excessively idle, and spend most of their time in drinking *chong*, for the preparation of which, as well as that of arrack, there are provisions in most houses. I do not think I ever saw a male Bootea employed, except indeed those who acted as coolies. All the work in doors and out of doors is done by women, to whom about Punukka Assamese slaves are added. The men are great admirers of basking in the sun, and even prefer sitting shivering in the cold to active employment.

I need scarcely add that both sexes are in all their habits inexpressibly filthy. The women in their extreme indelicacy form a marked contrast with such other Hill tribes as I am acquainted with.

The only use either sex make of water is in the preparation of food

or of spirits—no water ever comes into contact with any part of their person; they scarcely ever change their clothes, especially the woollen ones. The people about Bhoomlungtung are far the dirtiest, and as they wear dark woollen cloths, rendered still darker by long accumulation of smoke and dirt, they look more like representations of natives of Pandemonium, than of any place on the earth's surface.

As they, at least the official part, are very assuming, so does state enter largely into all their proceedings. All our interviews with them were conducted with all possible state on their part; and that exhibited to us at Tongsa and Punukka, was striking enough, and will ever after form in my mind as bitter a satire upon state as one could well wish. The effect was much lowered by the usual Asiatic want of arrangement, by an assumption of superiority among the inferiors (probably enough at the instance of their superiors), and by the admixture of the *profanum vulgus*, who had no opportunity of hiding inherent dirt under fine robes. On these occasions the behaviour of the chief was certainly gentlemanly, but the impression was soon obliterated by a messenger overtaking us, probably on our return, for another watch, or another telescope, or any other thing. In personal appearance I did not observe much difference between the higher and the lower orders, with the exception of the ex-Pillo of Tongsa, who seemed to have the best blood in the country concentrated in him. The presents given as returns of the magnificent gifts of the Governor General were beggarly; and yet there was a good deal of parade in their exhibition. To us narrow silk scarfs were always given, occasionally varied with a foot and a half of blanket. The scarfs are habitual gifts among all the upper classes, and very generally form the inner envelope of letters.

Fine woollens and embroidered China silks form the dress of the nobles; thick cotton or woollen doublets or tunics are common to every body else, but the chiefs probably have similar dresses in private, at least their principal officers certainly have; and the only difference in such cases is the belt, from which the *dha* is on occasions suspended these are embroidered, and have a rich appearance. The dress of all is certainly cumbrous, especially when the peculiarly Chinese boots are donned. The boots of the higher orders are certainly not made in Bootan; those of the lower orders consisted of a foot of some skin, with party-coloured woollen leggins, which lie above the calf. They are worn by both sexes.

The general receptacle for odds and ends, and a most capacious one it is, is between the skin and the doublet. Into this, which (consequent to one side being formed by the body) is not of the cleanest description,

every thing is thrust, from a handful of rice to a walnut, from a live fish to a bit of half putrid dried meat. Tobacco is carried in a small pouch suspended from one side.

A *dha*, or straight sword of a heavy description, is worn by all who can afford it, and the belt of this secures the loose doublet about the waist, and prevents the innumerable deposits therein from falling down. Those who cannot wear *dhas* from poverty, wear ridiculous looking knives, which dangling from the belt have a very absurd appearance. It is lucky that the people are not quarrelsome, and not inclined to resist the followers of chiefs, otherwise from the men being so generally armed, and so generally addicted to drinking, assaults might be expected to be of common occurrence; I only saw however one instance in which a man had been wounded. I certainly shuddered at times, expecting every moment to see adverse parties multiply each other by division; but latterly I was persuaded that cutting blows were rarely resorted to. The end of these disputes, which barring the blows were very fierce, was always brought about by the arrival of some third person, who by espousing one, espoused the stronger cause, and when this was done the weaker withdrew, or was made to withdraw by blows with the flat side of the weapon.

The accoutrements of a man of war differ, so far as his mere dress goes, in nothing. His defences consist of a well quilted iron skull-cap, which, when out of danger, is worn slung on the back; lappets are attached to it which defend the face—perhaps from cold. They also carry circular leathern shields, apparently of rather good manufacture. Their weapons of defence are first the *dha*, which is a heavy unwieldy weapon, without any guard. They are worn on the right side, but this to us awkward mode of wearing does not hinder a Bootea from disengaging his weapon readily, the sheath being first seized by the left hand. A blow from this weapon must cause a desperate wound, and judging from their quarrels, in which not a vestige of any skill in self-defence was shewn, the first blow, when actually struck, must decide the matter. Their fire arms, which are all matchlocks, and which vary in size from musketoons to huge wall pieces, are contemptible: they are of Chinese manufacture. Their powder, which they manufacture themselves, is powerless; indeed in one sense it may be considered as positively lessening power, for Captain Pemberton and Lieut. Blake ascertained that in ordinary charges it could not cause the discharge of the wad, and hence it actually weakened the cap. To remedy this badness they put in very large charges, but after all they seem to depend more on the effect of the noise than on that of the missile, for so little reliance is placed on this, that the marksman is

said to follow up the discharge by the piece by the discharge of a stone. It is likewise said that few venture to take aim except with the stone; they generally attach the gun to a tree, and without pointing it consider that they have performed a dangerous feat by causing its discharge. All the musketeers I saw, even when there was no ball in the gun, certainly averted their faces very studiously when the due fizzing of the powder warned them that the explosion would soon come on.

The most common weapon next the *dha* is the bow: this we only saw practised at Dewangiri, and the result was not alarming. The bows are longer than ordinary, at least so they appeared to my inexperienced eyes. It must be remembered that they do not, as in some more civilised places, fire at marks the size of an ordinary house. The mark which we saw was a small battledoor-shaped piece of wood, the distance was 150 yards, and the situation of the mark was pointed out by branches of trees; scarcely an arrow alighted within reasonable distance, yet the mark bore several marks, which we knew were made for the occasion. Each archer was very noisy in applauding his own skill, and challenging the others to equal it.

The dress of the women likewise consists of a loose garment, and is very similar to that worn by Hill tribes to the eastward of Assam. They have very few ornaments: the chief ones consist of a plate of silver fastened round the head, and crossing the upper part of the forehead, wire ear-rings of large dimensions, and peculiar rings fastened to a straight silver wire and worn projecting beyond the shoulder. They appear to be fond of flowers, and frequently decorate themselves with garlands, particularly of the scarlet rhododendron and the weeping willow.

The diet of the lower orders is very, very poor; they appear to live entirely on grain of an inferior nature, or in the wheat districts on coarse, abominably dirty chowpatties. There can be little doubt but that in many places they are not unfrequently much pinched by want.

The chiefs and their followers, and the inmates generally of the castles, live chiefly on rice brought from the plains; they likewise consume much dried fish, and very likely not a little dried meat, which they prepare by means of fire and smoke. They are as strict in their ideas of not eating flesh of living animals as the Burmese are; and they are beyond doubt very fond of animal diet: the salt is I believe brought from Thibet: they eat with the hand.

Their beverages are in the first place tea, but this is I believe used only by persons of some rank or property: they procure this from

Thibet, in the form of huge flat cakes: it does not possess a particle of aroma. Still more common is the beverage called *runga pat*, which may be likewise used for the tea; if their accounts can be relied on it is prepared from the leaf of a pear or medlar. I had no anxiety to taste it as it was of a muddy appearance and reddish colour.

Of intoxicating fluids they have two; one of these is merely fermented, and is known by the name of *chong*; it is a vile preparation from rice, made in the same manner, but very inferior in quality to that used by the Singphos. To this drink, which is not strong, they are immoderately addicted, and it generally is carried with them on journeys in large horns made from the horns of the *Mithan*.

The distilled liquor I had one opportunity of tasting; it was very clear, and much resembled weak whisky, as the Soobah had I imagine diluted it prior to distribution to the spectators.

The *political relations* of the country are as limited as the boundaries. With *Sikkim* they appear to have no intercourse. In the Kampas to the eastward there is some reason to believe that they pay an annual tribute. That they are tributary indirectly to Lhassa, and now directly to China, there can be no doubt, although the official people most strenuously denied it. It was affirmed indeed that a considerable time ago the Chinese were in actual possession of the country, but relinquished it finally on account of its poverty. China also exercises its authority in inflicting fines on them, and keeps guards on all the passes into Thibet. The tribute is taken I believe annually to Lhassa accompanied with an envoy. With the British government its chief relations have existed owing to the occupation of certain tracts in the plains called Dooars, from their being situated near the passes into the mountains. These tracts are of considerable extent, and are held by the Booteas on toleration, as the tribute they are under the obligation to pay is not only so small in amount as to be quite nominal, but is generally allowed to lapse into arrears.

In assigning the continuation of the possession of these tracts wherever an accession of dominion was gained, the British government acted with its usual liberal policy; but this liberality has been so little appreciated by the people of Bootan, that the system, as it has worked hitherto, has been fraught with mischief; it has been most positively injurious to the territories in the plains, and it is, I think, injurious to Bootan itself.

We had ample opportunities of observing the extremity of misrule to which the Dooars in Assam as well as those in Rungpore are subjected by the infamous government of the Booteas, and it was the more striking from the contrast presented by our Assamese territories,

and as much so, by those of Cooch Behar. The crossing of a river eighty yards wide is sufficient to carry one from a desert into a country, every inch of which is highly cultivated; yet the richness of the soil is in favour of the tracts immediately contiguous to the Hills, and such are, in Assam at least, especially esteemed by the most laborious part of the population, the Kacharies; and were it not for this predeliction in favour of these tracts, and the short-sightedness peculiar to a native population, by which immunity from taxation is preferred to security of property, the Assamese Dooars would rapidly become totally depopulated.

A gift long granted as a favour, in the eyes of an Asiatic, is soon considered as a right; and although the Bootea government has received some severe lessons in the shape of capturing their impregnable places, and of a resumption of portion of the Plain tracts, yet the free and quick restoration of the same on apologies having been made, with copious professions of better behaviour in future, has been attended with a very different result from that which would be occasioned by gratitude. The very severe lesson which they were taught in 1836, in which they were completely disgraced by being defeated by a handful of sebundies, and then punished by losing a Dooar, has taught them nothing. That very same Dooar, perhaps too liberally restored, has been for some months seizable for arrears of tribute. Nor is this all; since that restoration it would appear that their officers have become more than usually insolent. I think that it may fairly be assumed, that they argue on the certainty of restoration, so that a good foray might possibly, if its consequences were only temporary resumption, be a source of profit to them. By the plan of allowing barbarians to hold country in the plains, the inhabitants of those plains lose a portion of their most fertile soil; many of them are besides exposed to all the inconveniences and dangers of an unsettled frontier, for such must such a frontier be;* and hitherto it has not been attended, at least in many places, with the expected effect of securing the friendship of the Booteas, and the quiet of the frontier.

But no argument can place the matter in a clearer light than the facts connected with Herr Govindh, a subject of Bootan, but who is now independent both of Bootan and of the English government, and who therefore enjoys considerable tracts of country without paying any thing for them; nor can any thing more forcibly point out the weakness of the Bootea nation, for not only does Herr Govindh keep them in effectual check, but he has, I believe, offered to take all the Dooars

* Occupation of such tracts is very favourable to the carrying off of slaves, an habitual practice I have no doubt with the Booteas.

from them, if the government will allow him to pay 40,000 Rupees a year as tribute.

It acts injuriously on Bootan by diminishing the energies of its inhabitants, and suppressing the development of those resources which every habitable country may be supposed to possess. It must be remembered that the cultivation of the Plain tracts is not, as in some other instances, carried on by the inhabitants of the mountains, but by the natives of the Plains, who after reaping the produce of their labour appear to be compelled to take it to the first station in the Hills, from which it is distributed to the appointed places.

In all cases of entreaty for restoration it has been urged that the inhabitants of Bootan cannot subsist without these tracts, but they forget that by labouring in their own country they might supply themselves either with grain, or the means of purchasing it; and further, that the supplies drawn from the Plains are only enjoyed by the chiefs and their followers.

Some distress would doubtless result from immediate and final resumption, but this distress would be confined to the better orders, and would be a due punishment to them; it would in a short time be abundantly counteracted by the reduction of the Gylongs, and by the compulsion of a great number of idle hands to work for subsistence. It would also, I think, have a beneficial effect in lessening internal commotions. The ambition or rapacity of a chief is now readily seconded by the greediness of his idle followers, but were these necessitated to become agriculturists they would certainly not respond very readily to his call; as matters now stand, in short, there is a ruinous drainage of a very fertile tract of country, without any sort of return whatever; for the revenue derived from one Dooar during, a short season that it remained in our hands was amply beyond all proportion to the tribute; and it may fairly, I think, be stated that a country which draws every thing from another, and makes no return, may be compared to a parasite, the removal of which is always desirable, and very frequently essential. The Bootan government has been invariably treated with great liberality by the greatest power in the East, and how has it requited it? It has requited it by the rejection of a treaty which could only be productive of advantage to them, by shuffling mendacity, by tampering with British subjects, and by inconsiderate conduct to a British Mission, evinced in many other ways than that of opening its dâks. They object to forwarding communications to Lhassa, they object to British traders entering their country, and, in fine, they object to every thing that is reasonable, and that would be mutually advantageous. In short,

they shewed themselves to be ignorant, greedy barbarians, such as should be punished first, and commanded afterwards.

The objection raised against the resumption of the Dooars, on the plea that no check will then exist on the Booteas, is one contrived to meet expediencies: it has never been attended with the supposed effect. The affair of Herr Govindh, and the recent victory at Silkabhari are convincing proofs that the Booteas may easily be kept within their own limits. And even arguing the necessity of an increased military force, it must not be forgotten that the same tract which now yields us nothing but a few debased coins, a few inferior ponies, with abundance of disputes and law suits, would in a very short time become equal in richness to any of the neighbouring tracts, rich as these undoubtedly are.

PART III.

[*Natural productions, agriculture, domestic animals, arts, and commerce.*]

Few wild quadrupeds were seen by us in Bootan. Tigers, leopards, and elephants are to be found on the lower ranges, and probably the former straggle up to as considerable a height as they do to the westward. The chief beasts of prey in the interior are bears, but they do not seem to be numerous, and foxes of large size and great beauty: these last are confined to considerable elevations, and none were seen under 8000 feet.

Monkeys as usual abound on the lower ranges, on which the *Hoollock* of Assam likewise occurs. Some long-tailed monkeys occurred above Bulphai, 8200 feet above the sea; and in January I likewise saw a flock of noble ones not far from Tongsa, at an elevation of 5800 feet; these were white, and in form and size resembled the Langoors. Among wild ruminants, I may mention the barking deer, which however scarcely ascend above 4000 feet, and the musk deer, the most valuable wild animal of the country. It would appear to be rather common on the higher ranges, as several skins were brought to us from Punukka; the price for us, of a perfect one, that is without the musk, being five rupees.

The smaller animals that came under our notice were a species, I believe, of Lagomys, which Lieut. Blake found dead on the path, one or two animals of the weasel kind, and rats which swarm in very many of the houses.

Three or four species of squirrel were likewise procured, all from elevations of 5500 feet, yet all were likewise natives of Assam. The

most striking one is a black one, with a whitish belly, measuring, including the tail, nearly three feet.*

The variety of birds is, of course, considerable, but the lower ranges seem to be by far the most productive; on these jungle fowl and two species of black pheasant are found. The raven is found throughout, but the very familiar crow or jackdaw never leaves the plains, and never leaves populous places. Throughout the higher portions of Bootan it has as noisy, but scarcely possibly as mischievous a substitute in a red-legged crow. This is common in the three elevated valleys, and not rare elsewhere at elevations of 8000 to 9500 feet: and below these it is scarcely to be seen. Cuckoos, larks, magpies, jays, and sparrows were the chief European forms met with, but except the latter, perhaps, all were of different species from the birds known by those names in Europe.

The cuckoo is rather widely dispersed. I first heard it about Punukka, and subsequently along the Teemboo, at an elevation of 7000 feet; below this height, at least in this direction, its peculiarly pleasing voice was not heard, although I think I saw the bird considerably lower. With the magpie, which has much of the plumage of the European bird, but a shorter tail, we became familiar at Bhoomlungtung, but lost it at Jaisa. The jay, a figure of which may be seen in Mr. Royle's Illustrations, was found pretty constantly throughout the wooded tracts between 5500 to 7000 feet; it is a noisy, but not a very wary bird. Larks were very common in the elevated valleys, and afforded us some good shooting; in habits, plumage, and voice they are to an uninitiated eye the prototypes of the bird so well known in Europe. In the same valleys Syrases were common. Wild fowl are, as might be expected, rare; the only place where they occurred in tolerable plenty was in the jheel below Santagong. The most destructive and numerous bird is the wild pigeon, which is to be found in plenty in almost every village, and in literal swarms in the castles and palaces: they do a great deal of damage to the poor ryots, who are not allowed to destroy them, on account of their being sacred. This exclusion holds good very strictly about the residences of the chiefs; and, although the villagers were in all cases delighted to see them shot, yet they keep no check on their increase, as they have no means of destroying them, and appear never to have thought of doing so by means of their eggs. At Byagur, the place of this bird was supplied by another very curiously marked species, which, it is said, likewise occurs about Simla.

* *Sciurus beng-moricus*, McCl.

None of the wild birds are made subservient to use; indeed the natives appear to be very deficient in means for procuring them. The sacredness of life may be one reason, but even the most superstitious will eat any bird one shoots, provided it be large enough to promise a substantial repast.

The same remark is applicable to fish, which are common in most streams below 4000 feet. The two most common are the *Bookhar*, which is scarcely found higher than 2000 feet, and the *Adoee*, which is found as high as 4000 feet, and perhaps higher, but its habits render it difficult to see. The *Bookhar* abounds in the Deo Nuddee below Dewangiri; it is from the sport it affords, and the great readiness with which it takes a fly, to be considered as the trout of India. The *Adoee* is said to refuse all bait, and I have found this to be the case not only in this instance, but in all those which have a similarly situated mouth, such as the *Sentoosee*, *Gurriah*, and *Nepoorah* of Assam. At Punukka, where the *Adoee* is plentiful, it is caught by nooses; such as were so caught were all small, and the young anglers were obviously afraid of detection. At this place I saw a solitary instance of the use of a casting net, but I suspect that it was under authority; elsewhere I observed none even of the ordinary rude expedients for catching fish. Both of the above fish are nutritious food, and are so plentiful that they really might form a valuable acquisition to the miserable diet of the lower classes; but this would not suit the benevolent ideas of the priests, who however appear to eat stinking dried fish from the Plains with great sang froid. To the poor in Bootan every thing is denied. Bees appear to be plentiful, but their buildings are passed with indifference by the lazy Bootea.

Of the vegetable productions that occur naturally in Bootan, the application for purposes of life is confined to timber, fuel, and dyes.* Of the various kinds of timber trees I am quite ignorant; they are used chiefly for rafters, planks, and troughs, either for aqueducts or for mangers. A great part of the planking is derived from fir trees, which are always preferred for fuel. Of the turpentine procurable from their various species of *Pinus* they seem to make no use, so that they are ignorant of one great value of these valuable trees; that of the *Pinus excelsa* is very abundant, and highly fragrant. In the lower ranges the bamboo becomes of almost universal application, and constitutes the greater portion of the huts of the inhabitants of these districts; baskets of various sizes, and implements for clearing the rice from the husk by agitation, &c. are likewise manufactured from it.

* Although the *Bogh Puttur*, or path, is found in abundance on the higher ranges, yet it is not resorted to for furnishing an article of trade. The tree is a species of birch, and the thin flakes of its bark are used in the composition of *hookah* snakes.

In similar places rattans are in demand, and several valuable sorts may be procured. They form the fastening of all the bamboo work, are used in some places to secure the roofs from the effects of the violence of the winds, and form a great portion of the baskets in which loads are in this country universally carried. These are very convenient receptacles, forming a rather narrow parallelogram; they are frequently covered with hides, they open at the top, and are the most convenient hill baskets I have hitherto seen.

The Booteas depend on the plains for supplies of betel-nuts, otherwise they might advantageously cultivate the tree on many of the lower ranges. So far as I had an opportunity of judging, they possess few wild palms of any description, excepting rattans; I observed one, which grows on inaccessible places as high as 2000 feet, and which will probably prove new, but I did not succeed in obtaining the specimen requisite for actually determining whether it is so or not. *Ficus elastica*, the caoutchouc tree, occurs about Dewangiri, but not in abundance, and may be expected to occur throughout greater part of the ranges between the Plains and an elevation of 3000 feet. They are aware of the properties of the juice, and use it to make vessels formed from split bamboos, water-proof. The Simool tree likewise occurs within similar elevations, but they make no use of it, although in Assam the cotton is used for the manufacture of a very light and excessively warm cloth, excellently adapted for quilting.

A solitary mango tree occurs here and there in villages even as high as 4000 feet. The finest occurs at Punukka, in the royal gardens, which are emblematic of the poverty and want of horticultural skill in Bootan. It bears its flowers there at a time when the fruit is fully ripe in the Plains.

Jack trees occur every where about the villages on the lower ranges, and is one of the few fruit trees from which they derive any gratification. These trees thrive remarkably well at elevations of 2000 feet, particularly if within the influence of the Plains.

In villages at similar elevations two or three species of fig may be found, but the fruit is not edible; no oranges are cultivated with a view to the market; a few occur in some of the villages; the tree does not occur above 5500 feet, and in such altitudes it requires a sheltered, sunny place. The oranges which we received as presents, all came from the Plains. With the orange, the shaddock also occurs in tolerable frequence.

One of the most common fruit trees is the pomegranate, it does not thrive however above an elevation of 4000 feet: I saw no fruit on

the trees, which were however loaded with flowers; very fine ones occur about Punukka.

They likewise possess peaches, (perhaps the almond) and pear trees: but I am unable to say of what nature the fruit may be; we saw the trees during their flowering season.

The Bheir also occurs at low elevations; and in the gardens of Punukka I observed another species, forming a handsome good sized tree, but like most of the others, it was not bearing fruit. In the same garden there is cultivated a species of *Diospyros* with edible fruit, which also I did not see, and in fact we did not appear to have been in Bootan during the fruit season. The only fruit which we enjoyed were walnuts; we procured these only at Punukka, most of them in presents from the Deb, and a few by purchase, but these were of inferior quality; these walnuts are very good, and would be much better were care taken at the time of gathering. The trees are said to be cultivated in orchards at considerable elevations, but we saw no attempt at any thing of the sort, although we met with a few isolated trees here and there.

On the lower ranges, but scarcely above 3000 feet, the papaw occurs, but so far as I could see did not promise much return. Pine-apples, which occur so profusely on the Khasy hills, and are of so much use to the natives, are very rare in Bootan, as well as in those parts of the Dooars which we crossed.

On our return, we met with a fruit which promised under improved cultivation to be agreeable enough; it was about the size of a pigeon's egg, with a large smooth shining black seed; in flavour it approached somewhat to the Sappadillo, to the natural family of which it would seem to belong. The only ornamental tree to which the Booteas are particularly attached is the weeping cypress: these occur about all the castles and palaces, and especially about religious buildings. It is as ornamental a tree as can be well conceived, and as it thrives between elevations of 5000 to 7000 feet, I was very anxious to obtain seed for introduction into England; but all that I did obtain were bad, and I imagine that the female tree was alone met with. Of the gramineous plants found wild in Bootan no use seems to be made; wherever such plants are in requisition for thatching, the Plains are resorted to, as these, at least under the admirable management of the Bootea government, abound with *Oollookher*, *Kagara*, *Megala*, *Nol*, and *Ikora*. The plants of the hills themselves are chiefly coarse species of *Andropogon*, not serviceable for thatching; among these the lemon grass occurs abundantly. I am not aware whether the natives of these mountains use any plants occurring naturally as *vegetables*, cooked or uncooked; I

never saw any of that scrambling into the jungle on the part of the coolies which so generally occurs in Assam and Burmah, where every second or third plant is a favourite dish.

Of their medicinal plants I am quite ignorant. Our guide, Chillong Soobah, who had a great leaning to the practice of physic, assured me that the Booteas were quite ignorant of any medicine whatever; but this is so contrary to the prevailing practice among barbarous and semi-barbarous nations, that I place no confidence in the assertion.

Of the mineral productions of the country I had no opportunity of learning any thing. The only article of this nature that I saw turned to account was clay for pottery; and this was only met with at Punukka. In short, whatever the resources of the country are, one thing is at least certain, that they have not yet been developed; and I give the greater part of the nation credit for being amongst the most idle and most useless on the face of the globe.

Of the agriculture of Bootan little is to be said, as so very large a proportion of the supplies is derived from the Plains. The state in which the little agriculture is, that is carried on, argues as little in favour of the amount of agricultural skill they possess, as the uncultivated state of the Dooars does in favour of their numerical extent, or of that of their Plain subjects.

Of *Cerealia*, or culmiferous plants, they have the following sorts: rice, wheat, barley, raggy, millet, maize; and of farinaceous grains, not the produce of culmiferous plants, they have buckwheat; and of *Atriplex*, one or two species of the leguminous grains. They cultivate one or two species of *Phaseolus*, one of which is the *Phaseolus*, Max; the Oror, *Cytisus Casan*; the Pea, *Pisum satirun*.

The only oily seeded plant I saw, and of this only fragments, was the *Tel, Sesamum orientale*; I saw no reason however for supposing that they manufactured this oil themselves.

Of the culmiferous plants, rice forms the staple article of food, and is perhaps exclusively used by the chiefs and their adherents, and the very numerous establishments of priests. It is only the staple article viewing the Dooars as forming part of Bootan, for in the interior the proportion borne by this grain to that of either wheat or barley is very small.

Most of the spots available from situation and elevation are cultivated in rice, but in all I saw, judging from the remains of the stubble, the crops must have been small. The cultivation is conducted in the ordinary manner, as is likewise the mode of preparing the slopes for irrigation, or in other words, terracing: as might be expected it is generally a summer crop, and in all places of sufficient elevation, is

made to alternate with winter crops of wheat or barley. The highest elevation at which we saw it cultivated was about Tongsa, to the north of which village there is a slope cultivated with it from an altitude of 5500 feet to one nearly of 7000 feet.

It is principally used boiled in the ordinary manner, and in the preparation of their fermented and spirituous liquors. They do not seem to prepare it for eating in the dry state, as is so generally done by Hindoos. Wheat is perhaps the most common grain cultivated in the interior, yet I saw no instance of the promise of fine crops; it is cultivated as low as 3500 feet, and as high as 9000 feet, but the fields we saw at this elevation were miserably poor, from the effects of the bleakness of the winds. No particular steps are taken to favour its growth, except in the three elevated valleys, where manure is employed from some attention to agriculture being absolutely indispensable. The grain is, I think, of inferior quality; it is principally eaten in the shape of chowpatties, or cakes of heated dough. The flour is ground in mills turned by water, but the meal is badly cleaned.

Barley is nearly of equally extensive cultivation, and I think arrives to somewhat greater perfection than wheat; the cultivation is precisely the same, and probably its application. Two or three sorts occur; of these the finest indisputably is a six-rowed barley, but I am unable to say whether it is identical with the *Hordeum hexastichon,* the bear or bigg of Scotland. This sort occurred in great perfection along the ravine of the Teemboo, especially about Chupcha; it was the only crop, really worthy of the name that we saw in the country.

Of the remaining grains of this nature, Raggy,* *Bobosa* of Assam, is the most common; it is of a very inferior nature, and is only used as a makeshift. Millet and maize are so limited in extent, as not to be worth consideration.

Of the other farinaceous grains, buckwheat is the only one cultivated to any extent; it occurs throughout the greater part of Bootan, but especially about 4000 feet. This grain is either a great favourite with all Hill people, or it is of such easy cultivation as to compensate for its inferiority to some others. The Booteas do not appear to feed their cattle on it, and ours by no means approved of it. It is probably used as a bread corn.

The species of *Atriplex,* and one or two of a nearly allied genus, *Chenopodium,* are scarcely worth notice. They occur in Bootan, as in most other mountainous countries in the East, and are more valuable as affording sorts of spinach than for the grains. Equally unworthy

* *Cleusine Coracana.*

of notice are the leguminous grains of Bootan ; and the few species I saw of the produce appeared to me more probably derived from the Plains than from any labour of their own. The only actual cultivation of such I saw was a small plantation of oror below Benka or Tassgong, and this we were told was more with a view to the produce of lac than dâl ; and of the pea, I saw one flourishing field of small extent between Tumashoo and Oongar.

Of their various other " plants cultivated as vegetables for the table," I am quite as ignorant ; every thing in fact is derived from the Plains. We did not even meet with yams or *kuchoos,* both of which I have seen among other Hill people in great perfection. They are unaware of the value of the potatoe.

Every body has heard of Bootan turnips, but very few have, I imagine, seen them. With the exception of a few we obtained at Dewangiri we saw none, nor when we reached the interior did we ever hear of any. There is no doubt however that excellent turnip seeds have been sent to some from Bootan, but whether from this *bhote ka moolkh* or the far finer one to the westward, I cannot state ; I only state their extreme rarity, so far as the Mission was concerned. Far more common is the *Mola,* or radish, which I suspect Turner mistook for turnips, for one has only to imagine that an actual Bootan radish is a real Bootan turnip, and it is so. The Bootan radishes grow to a large size, but they are very coarse and spongy, and heavy of digestion even to a Hindoo stomach. The cultivation chiefly occurs between 5000 to 7000 feet.

Of plantains they possess a few specimens, which may be seen struggling for existence as high as 3500 feet. I did not even see any of the wild plantain, easily distinguishable from the white powder with which the under surface of the leaves is covered, and its large stature. This is common on the Himalayan range to the eastward, and ascends as high as 5000 feet.

Of that most useful family the Gourd family, I saw no sorts under cultivation. As they depend on the Plains for all that in their opinion makes life tolerable, so do they depend upon their jungles for all flowers to which they may have a fancy, or which may be considered as agreeable for offerings. There is no such thing as a flower garden in the whole parts of the country we saw. The royal gardens at Punukka are scarcely an acre in extent, and stretch along ther iver from the bridge to the village. It was made originally with a view to use, never for ornament, and possesses now neither the one nor the other recommendation, although it has an Assamese gardener: oranges, shaddocks, pomegranates, the mango, jack, bheir, &c. &c. are to be found

in it. The Booteas shew some taste in their selection of wild flowers, which is more than can be said for the natives of Bengal, who approve of such vile things as *Ganda*, and *Champa*, and many other equally strong or equally gaudy productions. With Booteas rhododendrons, especially the scarlet and the white arboreous sorts, are favourites, and I observed formed the greater part of some offerings lying in the presence of the Dhurma.

The only cotton, and it was a miserable specimen, that I saw, I have mentioned as occurring along the Monass; yet we were told that a good deal was cultivated in similar places throughout Bootan. That we saw none is accounted for by the bulk of the population wearing woollen cloths, and by the remainder obtaining their supplies from the Plains. No plants were observed used for making cordage, the ropes used for fixing the loads being either made of twisted rattan, or horse-hair. On emergencies the bearers resort to the jungles, in which some very tenacious creepers may be found; but they appear to prefer the species of *Daphne* for this purpose, as the inhabitants of Upper Assam do the *Ood-dal*, a species of *Sterculia*.

No sugar is cultivated in Bootan; a few solitary specimens occurring about villages being the only specimens we saw. The cane itself is imported from the Plains, as well as ghoor. The same is equally applicable to tobacco, large quantities of which must be consumed, as all the men are great smokers.

They do not appear to me to be great pân eaters; their supplies of this are also derived from that source, which they do not scruple to drain so freely. A few straggling plants of hemp are to be met with amongst most villages at rather low elevations, but I never saw any to an extent sufficient to warrant me in supposing that any use was made of it.

Of plants cultivated for dyeing, I am not aware that any cultivation is carried on. At Phullung, one villager was attempting to rear a few plants of the wild indigo, so much used in Upper Assam, and which I have elsewhere stated is a species of *Ruellia*. Of this plant which appears to abound in colouring material of a deeper, but less brilliant hue than that of indigo, I have not been able to meet with any account that can be depended on. I have seen that in one of the volumes of the Transactions of the Agricultural Society it is mentioned as *Ruellia carnosa:* no good authority for the name is given, and on that of the book itself few, I imagine, will be willing to adopt it.

The most common dye in Bootan is that furnished by the *mungisth*, it appears also to be the favourite colour. As the supply obtained from the jungles is plentiful, no means are resorted too to cultivate it. It

forms one of the few articles of export from the country, and is generally exchanged for dried fish. In Bootan at least two species are used, one of these is Roxburgh's *Rubia mungista.* Of the different species of *Rubia* very little is known, and that little is a good deal confused. From Mr. Royle's account it would appear that the article *Munjeeth* is the produce alone of *Rubia cordifolia* (*R.mungistha* Roxb.) The two species used in Bootan are very distinct, and very general constituents of other mountainous floras; one of them has leaves without stalks.

Agriculture being in such a poor state, we need not look for improvement in the implements by which it is carried on. The plough is a lumbering article, on the ordinary Indian principle, and the others are equally bad imitations; but as the Booteas pride themselves on being warriors, they are not inclined to turn their swords into ploughshares, and until this is done no improvement can be expected. Manures, so far as I had opportunities of judging, are chiefly confined to the three great valleys; they consisted chiefly of rotten fir leaves, and appeared to me to be of a very poor description. In these parts ashes of stubble and weeds are likewise spread over the surface, but the greatest portion of labour was expended in pulverising the surface. The natives likewise make use of the accumulation of filth under their houses, which judging from the depth of the layer is not always removed annually. This is excellent manure, and is principally used about the little plots of ground attached to most of the villages.

Of fences they are generally very regardless, or at best, place them where they are of no use. Thus the yards of many of the houses, and in some parts what are called gardens, are surrounded with stone walls; some few rising crops are protected by branches of thorny shrubs, but generally the only defence exists in the shape of a herd-boy, who is regardful only of damage done by his own charge.

In domestic animals they cannot be said to be rich. Chowry tailed cows certainly are not common, and would appear to be kept chiefly by the officers of high rank. As their range is restricted to very high elevations, they must be in Bootan of very limited utility. I only saw one sufficiently close to ascertain what kind of creature it was, and I was much disappointed in finding it an heavy, clumsy-looking animal; the specimen, however, was not a fine one. The only herds seen by the Mission were at elevations of nearly 10,000 feet. The Chowry tails exported to the Plains probably come from Thibet; and judging from those which we saw, they are of very inferior quality. The cattle are used as beasts of burden.

A much finer animal is the *Mithun;* this is the same as the Mithun

of the Mishmees, or the animal so known in those parts to the Assamese by that name, but is very different from the Mithun of the Meekir hills. This animal is not uncommon: the finest we saw were at Dewangiri, and none were seen after leaving Tongsa. Nothing can exceed the appearance of a fine bull; it appears to me intermediate between the buffaloe and the English bull, but the cows have much less of the heavy appearance so characteristic of the buffaloe. Their temper is remarkably fine, and their voices or lowing very peculiar, resembling a good deal some of the cries of the elephant. I am not aware that they are of much use to the natives: the oxen are employed at the plough. As the Booteas do not seem to care for milk, they are probably kept with a view to sacrifice, which is with an Asiatic not unfrequently another word for feasting.

The other breed which they possess, and which we only saw between Punukka and the Plains, assimilates much to the common cattle of Bengal; it is however a much larger and a much finer animal.

Sheep are not very common: the most we saw were rams, which formed a standing part of the russut. The ewes are used by the Kampas as beasts of burden, but I am not aware that they are of any use to the Booteas. Throughout Bootan I only saw two flocks.

Goats are common enough, and appear to be of the ordinary Plain breed. We saw no *Khussies*, at least live ones, unless I except the six shawl goats sent by the former Deb as presents to the Governor General.

All these animals are turned out during the day, either alone, or attended by boys. The cattle are picketted at night either in yards or about the villages: the goats find their own quarters in the ground floors of their owner's houses. Either no fodder at all is given, or they are provided with coarse straw, which evidently requires great effort to be eaten. During the rains their condition is much bettered; in the cold weather it is bad enough, as the looks of the beasts testify.

Pigs of ordinary customs are common enough, and were the only animals I saw slaughtered: they are kept with more care than either ponies or cows. They are generally treated to a wash once a day, consisting of a decoction of herbs, of which the common stinging nettle appears to be a favourite, and radish peelings. Most of the pigs we saw engrossed the tender cares of the women, who certainly paid much more attention to them than they would appear to do to their own children. They have peculiar cries well known by the pigs, who are generally very obedient, particularly if they see the wash-tub; at night they also occupy the ground floors. The ponies of Bootan are sufficiently well known, and are I think much over-estimated. They

are very inferior to the Ghoonts of Simla, in size, strength, and appearance. Like all such creatures they are spirited, and sufficiently headstrong: they understand their duties perfectly, and are orderly enough on a line of march, unless the road is particularly easy. Very few first class ponies are to be found in Bootan, and none are to be obtained except, perhaps, at most exorbitant prices. The Booteas patronise nothing but stallions, the mares being almost exclusively used for breeding or for carrying loads; in such cases they are not led, but follow their leader quietly. Ridden ponies are always led; in difficult ascents they are assisted by pushing up, and in descents they are equally assisted by vigorous pulling at the tail. They form a part of all out of door ceremonials, and are dressed out with gay trappings; their switch tails are then converted into regular cock-tails, and ornamented with chowrys. Three or four ponies were selected as presents to the Mission, but as the hour approached for presenting them, the liberality of the Deb rapidly fell, and one alone was given to the Governor General. This creature never reached the Plains, for after falling twice, once a height of 15 to 20 feet, it expired above Buxa: we heard afterward that it had been very ill for a long time, so that the Deb thought it a capital opportunity of getting rid of him.

The mules are fine, and of much more reasonable price than the ponies: they are chiefly kept for riding, and are mostly of good size.

Both ponies and mules are stabled and provided with litters, not as may be supposed of the cleanest description. Their food varies a good deal; on some rare occasions they partake of Indian corn and wild tares; still better off are those which have participated in some religious ceremonies—for these, the green corn of the poor ryot is not considered too good; generally, however, they are fed on the worm wood, which is so common throughout Bootan below 5500 feet, and which is cut up, and then boiled; and in some places they are fed on the young boiled leaves of an oak, not unlike the celebrated English tree. We saw few in good condition. It is probable enough that the ponies of the Deb and his chief ministers are occasionally treated to paddy husks, as the Deb very graciously sent us a handful or two of this nutritious material, in compliance with our requests for some grain for our ponies. Of grass they are deprived except during the rains, although Doab grass is to be found about Punukka in sufficience to feed six or seven ponies a day.

The ordinary dog appears to have been brought from the Plains, but its pariah qualities are not improved, neither is its condition. Of this, one was so convinced, that he took advantage of our escort, and returned to his native country with us, evidently highly pleased at

his escape, and very grateful to us for our good offices. Many of the better orders keep Tartar dogs: these are large, shaggy, powerful beasts, apparently very fierce, and the most incessant barkers I ever met with; they are always kept chained up. At a white face they appear perfectly furious, but perhaps they rely on the chain. Turner says they are not so bad if one is armed with a bludgeon. Mr. Blake found that in almost every instance their eyes were of different colours.

Of domestic birds, the common fowl is the only one: in many places it reaches considerable perfection; about the capital the breed is as bad as can be imagined. They all appear to be low-bred, and the old birds, especially the cocks, are generally lame from corns. Their crows are most curious, and very unlike those of any other variety I know of; it is of inordinate length, and when once commenced can not be stopped, for fright only changes it to a hasty gobble. The bird, while he is undergoing the process, walks along with neck and tail at full stretch, and with his beak wide open, totally absorbed in the business. No care is taken of the fowls, or at most, they are allowed to stand round when rice is cleared or pounded.

They have no ducks or geese, a want they share with all the mountainous tribes I have seen. A peacock is occasionally to be seen in the castles, and at Tongsa we saw one associated with a tame jacana.

Fine Arts.—The ordinary form of houses in Bootan is that of a rather narrow oblong, disproportionately high, building: the better order are rather irregular in shape. They are built either of slabs of stone, generally unhewn, or of mud well beaten down; the walls in all cases are of considerable thickness, and almost universally slope inwards. They are for oriental houses well provided with windows, and are further furnished with small verandahs, of which the Booteas seem very fond. There is little or no ornamental work about them, with the exception of those infested by priests, in which there is generally a rather ornamental verandah. The roofs throughout the interior are of bad construction; they are formed of loose shingles, merely retained in their places by heavy stones placed on the top of each; this necessarily requires a very small slope, but even small as it is, the whole roof occasionally slips off. In some few places where bamboos are available the roofs are formed by bamboo mats, placed in several layers, and secured either by stones or rattans. In the better order of houses the great perviousness of the roof is compensated for by the imperviousness of the ceiling of the uppermost story, which is well laid down with mud; houses situated near the plains, where proper grasses are obtainable are thatched: (the most common grass is the Oollookher, *Saccharum cylindricum*), such roofs from their slope,

thickness, and projecting eaves are excellent. The generality of houses have a court-yard in front surrounded by a stone or mud wall, the entrance to which is, or has at one time been, furnished with a stout door. Access to the first floor, (for the ground floor is invariably occupied by pigs, goats, &c.,) is gained by a rude sort of stair, intermediate between real stairs and ladders, and rather dangerous: a greater degree of safety is sometimes insured by the presence of a banister. Each story is divided into several apartments, which are generally defective in height; no regularity in their distribution appears to be ever observed; they are not provided with chimneys, and in many instances we found the smoke almost intolerable.

The houses of the poorer orders, situated near the plains, are miserable habitations, but still are better than those in common use in Bengal and Assam, in as much as they are built on muchowns.

The castles and palaces are buildings of a much superior nature; indeed it is said that they are erected by Thibetans or Chinese. They are of immense size, varying a good deal in form, according to the nature of the ground on which they are built, and which is invariably a spur or tongue of land situated between the junction of two streams. If the ground be even, the form chosen seems to be parallelogrammic, but if it be uneven, it has no form at all. They are, particularly in the latter case, ornamented with towers and other defences, either forming part of the building or detached from it.

The national walls and roofs are preserved; the former are of great thickness, pierced in the lower part with narrow, utterly inefficient loop-holes. In the interior there are one or two large court-yards. The first and second stories are the chiefly inhabited ones, the ground floor, however, is not so profaned as in other houses. Most of them are ornamented with a raised square or oblong tower or building, in which* * * take up their quarters. That of Punukka is the largest and loftiest, consisting of several stories, and several roofs gradually decreasing in size—an obvious imitation, except in the straightness of the roofs, of the Chinese form; it is in part covered with copper, as the Booteas assured us, gilt.

All these large buildings, as well as the summer-houses attached to them, the houses of recluses, or active priests, the resting houses of chiefs, and religious edifices of every kind or description, are white-washed, and most are ornamented with a belt of red ochre, not far from the roof. The residences of the great men, and some of the religious edifices, are distinguished by a folded gilt umbrella stuck on the top, resembling a long narrow bell, rather than that for which it is intended.

* A blank in the M.S.—Eds.

In none do there appear to be any particular accommodations for sleeping, but in each house there is a *cloacus*. One room is set apart for a cook-room, and constitutes the principal inconvenience in a Bootea house; no use is made of the uppermost story for this purpose, as the Booteas consider it sacred; and as they have no chimneys, out of pure reverence they are content to bear smoke in its blackest and most pungent forms. Their fire-places, that is for cooking, are good and powerful; these are likewise used as furnaces for their stills. A good representation is given of them in Turner's Bootan. The flooring of the houses is generally good, of many really excellent; the doors are folding, and the fastenings of the windows of similar construction; the only very deficient part of a good Bootea house exists in the stairs and want of chimneys.

To the castles, stables are appended; but in spite of their being deprived of this copious source of filth and vermin, the deficiency is made up by the number of inhabitants.

Of their religious edifices, some are of picturesque appearance, being ornamented with carved window-frames and verandahs. The most common are the pagodas, which approach in form to the ordinary Boodhistical forms, such, at least, as are universal throughout Burmah. Those of Bootan are, however, vastly inferior in size, form, and construction, and are mostly such as an ordinary Burmese peasant would be ashamed of building. They are built of slabs of unhewn stone, and are not much ornamented, particularly as they are not provided with a red belt. The handsomest and the largest* we saw was that close to Chinjipjee, this was ornamented with small pagodas at each corner, and had the umbrella, which was of curious form, garnished with bells, with the usual long tongues. In the upper portion each face had a nose of portentous dimensions, and two Chinese eyes. I am not aware whether, as in Burmah, they contain images or not, but slabs of inscribed slate are very generally let into their sides.† Appended to these are long walls of poor construction covered with roofs; on each they bear inscriptions, and in some instances paintings situated in recesses. The other forms generally occur as small square buildings; they are either built up over large idols or are empty, but decorated with paintings of gods, much resembling, especially in gaudiness, the common sorts of Hindoo deities; or they contain the peculiar cylinders which contain incantations, and which are constantly, or at

* The name of this, *Chiotackari kocho*.

† The pagodas are always surrounded by poles either of bamboo or fir, to which are attached longitudinally long strips of coarse cotton cloths, entirely covered with inscriptions.

least ought to be, kept in motion by the action of water. In some places where running streams are not obtainable, as in the Soobah's houses, these are revolved by the hand.

There is nothing particular in the construction of their flour mills, which are very small; the pivot is vertically attached at the bottom to an horizontal water wheel, and passing above through two horizontal stones, of which the upper one alone revolves, the flour is hindered from falling off the under stone by the person in attendance.

Of bridges they have two kinds, the suspension and wooden; the latter are, I think, of better construction than the former, although not of equal ingenuity. The finest suspension bridge in Bootan is that across the Monass, below Tassgong, and has a span of about sixty yards. The chains are slight, and the links too long; the masonry by which the chains are supported is massive, and built into tall respectable looking towers. The motion is very considerable. The great fault in this bridge, and in this respect it is inferior to that of Chicka, is that its bottom or platform is not flat, but forms the segment of a circle, and is continuous with the sides, which are made of bamboo matting.

The wooden bridges, which are thrown over all the second class torrents, are solid looking, and impress one with the idea of great strength. Considerable pains are taken in the selection of such spots where the span is less, and where solid abutments either exist, or may be readily made. The supports are large beams placed in pairs, with a cross timber between each, and which pass through the abutments, on which towers are erected for the purpose of giving stability. The beams gradually increase in length from below upwards, so that each projects somewhat beyond that immediately below it. On the upper pair, which form a slightly inclined plane, planks are placed. As the upper beams only project over perhaps one-third of the span, the centre of the bridge is made up of horizontal beams and planks; if quite complete the bridge is covered with a chopper, and provided on either side with a stout open balustrade. Small streams are crossed by planks, or timbers, the upper surface of which is rendered plane. From the consideration of their buildings it would appear that they possess considerable architectural genius;* but we were told that all those of superior construction are built by Thibetans or Chinese; this was certainly the case with the bridge erecting over the Deo Nuddee, not far from Dewangiri. As long as nature supplies rocks of easy and perfect cleav-

* Turner in mentioning their aqueducts draws a comparison between the Booteas and the wonderful ancients; he compares a few wooden troughs, applied end to end, and so badly constructed that one kick would demolish considerable portions, to those masterpieces of master minds which laugh at time.

age, the houses are built of such materials, and these are used perhaps in all cases in the constructions of rank or sacred character. In many places mud is resorted to; the mud is pressed tightly between planks, and then assiduously beaten down by feet and clubs; in this they shew great dexterity, five or six persons, chiefly women beating at once a piece of mud of small dimensions. The mud is beaten down on that which has been previously so treated, so that when they come to any height, there must be considerable danger of falling, particularly as the beaters make most extraordinary antics. When each piece is sufficiently compacted it is allowed to dry. As portions of mud of a parallelogrammic form are thus treated, the house presents lines, which at first lead one to suppose that it is built of blocks of coarse sand-stone. The process is very tedious.

The sculpture they possess would appear to be Chinese: some of the figures were really excellent; the finest we saw were at Dewangiri, especially that of the Dhurma, before which it is considered impossible to sin, and this may be the reason of the natives striving so strenuously to do so. All these figures were well dressed. The few figures of Boodh that I saw were rather rude, in the usual position, and with the usual long fingers and toes. These people certainly have an idea of drawing, and this was very pleasing. To a native of the Plains you may shew a drawing which you have every reason to be pleased with, particularly if you have done it yourself, and he says, "*kya?*" or he mistakes a house for a boat, or a tree for a cow. In Bootan, however, the case is very different; our sketches were recognised immediately, no matter what subjects we intended to represent. They are also ready at comprehending charts. And with regard to their own performances we had opportunities of judgment presented to us by the walls of many houses, which were covered with scrawls; they excel in the representation of animals, particularly when the shape depends upon the will of the artist.

Music enters into most of their ceremonies, and the favourite instrument emits a sound like that of a bassoon. Another favourite instrument is a clarionet, particularly when made from the thigh bone of a man: the sound of this is equal to that of any Bengal musical instrument, and is as disagreeable as it is continuous, the skill of the performer depending entirely upon his length of wind. One of these instruments generally heads every procession of sufficient importance.

At two of our interviews with Soobah we had an opportunity of witnessing the mode of dancing, which was done entirely by women, and as certain qualifications for dancing girls exist to a remarkable extent in Bootan, they are chosen indiscriminately. The dancing merely consists in slow revolutions and evolutions, and outturning of the

hands. They danced to their own music, which consisted of a low monotonous chanting, of a much more pleasing nature that the altissimo screeching so admired in India.

Of their manufacturing skill I saw few or no instances. All the woollen cloths of ordinary quality are imported from Bengal or Thibet; their own manufacture being, it is said, confined to the production of coarse, often striped, blankets, scarcely a foot wide. They make but very little cotton cloth, and the manufacture of this appears to be confined to the villages near the Plains; the article is of poor and coarse quality: all their silks and many other parts of their fine apparel are Chinese.

I have before mentioned the use they make of bamboos, and rattans: in the work of articles manufactured from these materials they are not superior to the wildest of the Hill tribes to be found about Assam.

Their ordinary drinking cups are wooden, and look as if they were turned; and they are perhaps the best specimens of manufacture we witnessed.

Their workers in metal are very inferior; we saw some miserable blacksmiths and silversmiths, provided with utterly inefficient apparatus; however there is not much demand on their skill, as all their arms, and all their better sort of utensils are of foreign manufacture, principally Thibetan. They are said to manufacture the copper pans used for cooking or dyeing, and which are frequently of very large dimensions; and they went so far as to point out the place of manufacture, viz. Tassangsee. But I doubt this, for in the first place the vessels resemble much those made in Thibet; and in the second, I saw nothing like any manufacture going on at Tassangsee, except that of burning charcoal, which is much used in cooking. Paper they certainly do make, and in some quantity: I had no opportunity of seeing the process. The material is furnished by two or three species of *Daphne.* The article varies much in size, shape, and quantity; the finest being white, clean, and very thin; the worst nearly as coarse as brown paper. If bought from the manufacturers themselves it is cheap, the price being six annas for twenty large sheets; if from an agent the price of course increases in a centesimal proportion. It is well adapted for packing, as insects will not come near it, always excepting the formidable white ant, who however consumes the contents of the paper, not the article itself. This paper appears to be precisely the same as that manufactured to the north-west and south-east by the Shan Chinese.

The only potteries, I saw were near Punukka, but although they supplied the capital, there were only two or three families employed. The clay is obtained close to the potteries, and is of tolerable quality;

it is pulverised by thrashing with a flat club, and is then sifted. It is subsequently kneaded by means of water into the proper consistence. The operations are conducted entirely by the hand, and the dexterity which is shewn in fashioning the vessels is considerable. Of vessels for containing water the upper half is made first, and the under is added afterwards. Those made during the day are burnt at night, being covered with straw, which is then set on fire; the finishing operation, if required, and which is intended as a substitute for glazing, is rubbing them over with tarry turpentine; they are then packed and carried off to market, or rather to the palace: the artists are the poorest of the poor, and as filthy as any other class in Bootan. They live close to the potteries, in the most miserable hovels imaginable. The wares they furnish are of several sorts—dishes, and pans, (some of which have very small inefficient handles) gurrahs, and large oblong vessels for containing water; of these one family consisting of ten or twelve can make a considerable number, say sixty in one day.

Of their manufactures of leathern articles I can say nothing: the only articles I saw of this nature were the boots, which are of untanned hides, and the reticules for holding tobacco, which are of decent fashioning, tanned and coloured. And I believe I may here close the list, meagre as it is, for the sugar, oil, ghee, &c. they use, is all brought up from the Plains. As their manufactures are at so low an ebb, not much is to be expected in the way of commerce; and this must continue to be the case so long as they derive every thing from the Plains, and make no returns whatever; so long as they may live an idle life at the expense of others. Throughout the country indeed there is but little evidence of frequency of intercourse. The busiest place by far was Dewangiri, but this depended chiefly on the steps taken for the provision of our party, and on the daily assembling of the Kampas prior to descending to Hazoo. The Deb is stated to be the principal merchant, but we only met two coolies laden with his merchandise! All the Soobahs likewise trade, but I apprehend their dealings are altogether insignificant; for excepting their followers, who are disinclined to pay, even had they money, and the priests who will not pay, I know none from whom advantage in the way of traffic could with any reason be expected.

The exports from Bootan to the Plains are generally exposed for sale at annual fairs, of which Hazoo and Rungpore are the principal. The articles are ponies, mules, woollen cloth, and rock salt. To these I must add a peculiar spice, known in Assam by the name of *Jubrung,* and which is used, I believe, to some extent by the natives in their cookery. It is very fragrant, very aromatic, and excessively pungent, and if kept in the mouth but a short time, occasions a

remarkably tremulous sensation of the tongue and lips. It is the capsule of a species of *Zanthoxylon* found on other mountains to the north-east, although I am not aware whether it is used as a spice elsewhere than in Bootan. Captain Jenkins first pointed it out to me, and I had several opportunities of seeing the shrub producing it during my visit to Bootan. All these are of inferior quality, scarcely less so, perhaps, than the article in which they pay the greater part of even their nominal tribute. From Thibet they obtain all their silks and tea, there is, however, very little intercourse between the countries.

I am afraid that this very imperfect account will be considered as prejudiced; but I believe it will be found, if put to the test, tolerably faithful. I went into the country prepossessed in favour of every thing bearing the name of Bootan—I expected to see a rich country, and a civilized people. I need not say how all my expectations were disappointed. Whatever ulterior benefits may be derived from the Mission, one, and that by no means inconsiderable, has already resulted—I allude to the demolition of the extravagant ideas entertained, even by our frontier officers, of the prowess and riches of Bootan. As the Mission will have been the means of reducing this people to their proper level among barbarous tribes, we may expect their demeanour will become more respectful, their behaviour more cautious, and the payment of the tribute more sound and more punctual. In a word, they will understand that they are tolerated by—not the equals of—the gigantic British power. I have stated my opinion of them with some severity, but with impartiality; and my conviction is, that they are in all the higher attributes very inferior to any other mountainous tribe I am acquainted with on the north-east frontier.

It must not be supposed that, however disgusted with the inhabitants of the country, the Mission was not a source of great gratification to me. It afforded me an opportunity of visiting a very alpine country; and, what is much more important, of fixing, through the kindness and skill of Captain Pemberton, the localities of nearly 1500 species of plants with such accuracy, that the collection will be of much interest to all students of botanical geography. It afforded me too an opportunity of profiting from the valuable instructions of Captain Pemberton; so much so, that it will always be a matter of regret to me that I was so ignorant of so many essential requisites during the other journeys I have had the honour of performing.

WILLIAM GRIFFITH,

Asst. Surg. Madras Est. in Med. charge Bootan Mission.

ART. II.—*Account of Tamba Patra Plates dug up at Baroda in Goojrat; with Facsimile and Translation.*

(Laid before the Meeting of the Asiatic Society of 5th June, 1839.)

The Tamba Patras now submitted to the inspection of the members of this Society were placed in my hands by Mr. W. P. GRANT, who obtained them from BENI RAM, of *Baroda*, and whose account of the method of their discovery as derived from that person, was, that they were dug up in excavating the foundations of a house in that city.

The grant is peculiar in many respects. It is in a character not exactly corresponding with any previously observed, but sufficiently similar to that of the grants decyphered by Mr. WATHEN to be easily made out by persons accustomed to the work, after a little study and comparison. The pandits and antiquaries of *Baroda*, indeed, were baffled in their attempts to make out the character, and the plates were put into my hands as undecypherable; but KAMLAKANTA, the pandit who assisted our late Secretary in his discoveries, undertook the task of reading them with confidence, and accomplished the complete transcription into Devanâgrí in about a fortnight. The plates are submitted to inspection with a transcript, fac-simile, and close translation, the latter made by SARODA PARSHAD CHAKRAVARTI.

They are found to be the record of a deed of grant made by KARKA' Raja of *Lâtéshwara* to BHA'NU BRAHMIN, son of SA'MADITYA, in the year of Saka 734, corresponding with 812 A.D., that is, just one thousand and twenty-seven years ago. Their state of preservation is wonderful for such a period, but that may be owing partly to the purity of the copper, and partly to the care with which the edges have been beaten up so as to take all the friction, and prevent the faces of the plates from rubbing against one another. Their present appearance is owing to an acid having been used to clean them.

Although uniformly clean and bright, the marks of corrosion will be observed in several places, which are the effect of antiquity; but fortunately the letters are so deeply engraved that scarcely any are completely effaced.

The historical facts deducible from this Tamba Patra are the following:—

First, That towards the end of the 8th and beginning of the 9th century of our era, that is during the reign of CHARLEMAGNE of France, Hindoostan and the Dukhun were divided into four kingdoms:—The *Gajara* Raj westward—the *Malwa* Raj centrical—to the east the *Gourha* Raj, (including *Bengal* and *Behar*)—and the *Lâtéshwara* Raj

to the south; of which last the reigning Raja in 812 A.D. was KARKA' Raja, the maker of this grant.

Secondly, That in the *Lâtéshwara* Raj the following kings, ancestors of KARKA' Raja, had successively reigned :—

1. GOVIND Raja.
2. KARKA, Raja, his son.
3. KRISHNA Raja, his son.
4. DHRUVA Raja his son, who obtained the beatitude of dying at Allahabad where the waters of Jamna and Ganga unite.
5. GOVINDA Raja II, son of Dhruva.
6. INDRA Raja, brother of Govinda.
7. KARKA, Raja II, son of Indra Raja.

Thirdly, It further appears that in 812 A.D. KARKA Raja had no son; but his brother DANTI VARMA signs as heir presumptive.

Fourthly, The capital of the *Lâtéshwara* Raj appears to have been *Elapár*, where a magnificent fort and temple of Siva are stated to have been erected by the third of the above race—the KRISHNA Raja.

It remains to identify this dynasty. Of all the lists of Rajas and races collected in the late Secretary's useful tables, the one, and indeed the only one, which contains names corresponding with those found in the present grant is that given in Table XLIV. page 121, headed "Rajas of Chera or Konga," (comprehending *Salem* and *Coimbatore*) and stated to be taken from the late Colonel Mackenzie's manuscript collections.

Amongst the twenty-six princes of that dynasty, taken from the *Kongadesa Raja Kal*,* all the names of our list are found except that of INDRA Raja, the father of KARKA Raja II. This latter name, KARKA, I take to be identical with that of KONGANI, which occurs thrice amongst the twenty-six. The period assigned inthe useful tables for the Rajas of *Kongadês* corresponds exactly with the date of our grant; nevertheless I do not feel quite satisfied with the evidence to the identity of *Lâtéshwara* with the Kongadês, and I should wish the attention of the learned and curious to be directed to the determination of this point, and to the ascertainment of the locality of the famous fort of *Elapár*.

H. T. P.

* The notice of this work will be found in page 198 of Professor WILSON's printed account of the collection of Col. MACKENZIE's manuscripts, and again in the Rev. Mr. TAYLOR's more recent examination of the manuscripts at Madras. There are, it appears, two copies of the work in Tamul on Palm leaves, from which Mr. TAYLOR has had a copy transcribed on paper, and deeming the work valuable, he has translated it.

स वो ऽव्याद्दचसामीशो यन्नाभिकमलाश्रितः ।
हरश्च यस्य कान्तेन्दुकलया समलङ्कृतः ॥१॥

स्वस्ति स्वकीयान्वयवंशकर्त्ता श्रीराष्ट्रभूपामलवंशजन्मा ।
प्रयाणशूरः समरैकवीरो गोविन्दराजः क्षितिपो वभूव ॥२॥

यस्याच्छिमाचजयिनः प्रियसाहसस्य
क्षमापालवंशग्रहनमेववभूव सैन्यं ।
मक्त्वा च शङ्करमधीश्वरमीश्वराणां
नावन्दतान्यममरेष्वपि यो मनस्वी ॥३॥

पुचीयतश्च खलु तस्य भवप्रसादात्
सूनुर्बभूव गुणराशिरुदारकीर्त्तिः ।
यो गौणनामपरिवारमुवाह मुख्यं
श्रीकर्कराजसुभगव्यपदेशमुच्चैः ॥४॥

सौराज्यजल्पये पतिते प्रसङ्गान्निदर्शनं विश्वजनैकसम्पत् ।
राज्यं कुलैः पूर्वमहो बभूव क्षितौविदानीन्तु नृपस्य यस्य ॥५॥

अत्यद्भुतंचेदममंस्त लोकः कलिप्रभावेण यमेकपादं ।
जातं वृषं यः कृतवानिदानीं भूयश्चतुष्पादमविघ्नचारं ॥६॥

विष्णौ जगत्त्राणपरे मनस्थे तस्योचिते तन्मयमानसस्य ।
धर्म्मात्मनस्तस्य नृपस्य जज्ञे सुतः सधर्म्मा खलु कृष्णराजः ॥७॥

यो वंश्यमुन्मूल्य विमार्गभाजं राज्यं स्वयं गोत्रहिताय चक्रे ।
ब्रह्मण्यभा तस्य च कापि सा भूद्विप्राय या केवलजातयोऽपि ॥८॥

श्रेष्ठद्विजन्मोचितदानलुब्धाः कर्म्माण्यनुष्ठानहतानि चक्रुः ।
इक्षातिरेकेन क्षपीवलानां पयो यथा मुञ्चति जातु मेघे ॥
भवेन्मनस्तद्विरतौ तथाभूद्यस्मिन् धनं वर्षनि सेवकानां ॥९॥

यो युद्धकण्डूतिगृहीतमुच्चैः सौण्यौष्मसंदीपितचापदन्तं ।
महावराहं हरिणीचकार प्राज्यप्रभावः खलुराजसिंहः ॥१०॥

एलापुराचलगताद्भुतसन्निवेशं
यद्वीक्ष्य विस्मितविमानचरामरेन्द्राः ।
एतत् स्वयम्भुशिववामनकृचिमेश्री
र्दृष्टेदृशीति सततं बङ्क चर्चयन्ति ॥११॥

भूयस्तथाविधकृतौ व्यवसायहाने
रेतन्मया कथमहो कृतमित्यकस्मात् ।
कर्त्तापि यस्य खलु विस्मयमाप शिल्पी
तन्नामकीर्त्तनमकार्य्यत येन राज्ञा ॥१२॥

गङ्गाप्रवाहहिमदीधितिकालकूटै
रत्यद्भुताभरणकैः कृतमण्डनोऽपि ।
माणिक्यकाञ्चनपुरःसरसर्व्वभूत्या
तत्र स्थितः स्वयमभूष्यत येन शम्भुः ॥१३॥

नृपस्य तस्य ध्रुवराजनामा महानुभावस्तनयो बभूव।
तृणीकृतान्यस्य पराक्रमेण प्रतापवह्निर्द्विषतो ददाह ॥१४॥

लक्ष्मीप्रसाधनविधावुपयोगिकृत्यं
यश्चिन्तयन् स्वयमभूदनिशं कृतार्थः ।
किञ्चात्र चित्रमनपेक्ष्यसहायमीशः
सर्व्वःपुमान्निजबधूं स्ववशां विधातुं ॥१५॥

यो गङ्गायमुने तरङ्गसुभगे गृह्णन् परेभ्यः समं
साक्षाच्चिक्रनिभेन चोत्तमपदं यः प्राप्तवानैश्वरं ।
दर्पासम्मितवैभवैरिव गुणैर्यस्य भ्रमद्भिर्दिशो
व्याप्तास्तस्य बभूव कीर्त्तिपुरुषो गोविन्दराजःसुतः ॥१६॥

प्रदेशवृत्तिव्यवसायभाजां पुरातनानामपि पार्थिवानां ।
यशांसि यो नाम जहार भूयो भग्नप्रचण्डाखिलवैरिवीरः ॥१७॥

उन्मूलितोत्तुङ्गनरेन्द्र वंशो
महानरेन्द्रीक्षततुङ्कतुल्यः ।
स्वेच्छाविधायी चरितानुकारं
चकार यो नाम विधेः क्षितीशः ॥१८॥

क्षिप्तीरक्षिप्तरणोचरणानरातीन्
कुर्वन् क्षणेन विदधेऽद्भुतकर्म्म यस्य ।
चक्रे तथाहि न तथाशु वधं परेषां
पार्थोऽपि नाम भुवनक्षितयैकवीरः ॥१९॥

कल्पक्षयक्षणसमुद्भववातहेला
दोलायमानकुलशैलकुलानुकारं ।
यन्मुक्तचण्डशरजालजवप्रपन्ना
युद्धागतारिपुगजेन्द्रघटा चकार ॥२०॥

भ्राता तु तस्येन्द्रससानवीर्य्यः श्रीमान् भुवि क्षमापतिरिन्द्रराजः ।
शास्ता बभूवाद्भुतकीर्त्तिसूतिस्तदा तु लाटेश्वरमण्डलस्य ॥२१॥

अद्यापि यस्य सुरकिन्नरसिद्धसाध्य
विद्याधराधिपतयो गुणपक्षपातात् ।
गायन्ति कुन्दकुसुमस्मियशोयथास्व
धामस्थिता सहचरीकुचदत्तहस्ताः ॥२२॥

येनैकेन च गुर्ज्जरेश्वरपतिर्योद्धुं समभ्युद्यतः
शौर्य्यप्रोद्धतकन्दरो मृग ईव क्षिप्रं दिशो याहितः ।
भीतासंहृतदक्षिणापथमहासामन्तचक्रायते
रक्षामापविलुप्यमानविभवं श्रीवल्लभेनादरात् ॥२३॥

तस्यात्मजः प्रथितविक्रमवैरिवर्ग
लक्ष्मीहरोहरपदाम्बुजलग्नचित्तः ।
श्रीकर्कराज्यपरिपालनसर्व्वरीशः
शास्त्रार्थबोधपरिपालितसर्व्वलोकः ॥२४॥

राज्ये यस्य न तस्करस्य वसतिर्व्याधेः प्रसूतिर्मृता
दुर्भिक्षं नच विभ्रमस्य महिमा नैवोपसर्गोद्भवः ।
क्षीणो दोषगणः प्रतापविनताश्चैवारिवर्गास्तथा
नो विद्वत्परिपन्थिनी प्रभवति क्रूरा खलानां मतिः ॥२५॥

गौडेन्द्रवंशपतिनिर्जयदुर्व्विदग्ध
सद्गुर्ज्जरेश्वरदिगर्गलताश्च यस्य ।
नीत्वा भुजं विहतमालवरक्षणार्थं
स्वामी तथान्यमपि राज्यफलानि भुंक्ते ॥२६॥

तेनेदं विद्युच्चञ्चलमालोक्य शाश्वतं क्षितिदानं परमपुण्यं प्रवर्त्तितोऽयंधर्म्मदायः। सच लाटेश्वरसमधिगताशेषमहाशिष्टमहासामन्ताधिपतिसुवर्णवर्षश्रीकर्कराजदेवो यथासम्वेध्यमानकान। राष्ट्रपतिविषयपतियामकूलाधिकारिकमहत्तरादीन् समनुबोधयत्यस्तुवः संविदितं यथामया सिद्धशर्म्मसमावासितेन मातापित्रोरात्मनश्चैहिकामुष्मिकपुण्ययशोभिवृद्धये श्रीवलभीविनिर्गतचातुर्व्विद्यसामान्यवात्स्यायनसगोत्रमाध्यन्दिनसब्रह्मचारिब्राह्मणभानवेभट्टसोमादित्य

पुत्राया क्षोट्टकचतुरशीत्यन्तर्गतपद्रकाभिधानग्रामैर्य्यस्याघाटनानि पूर्वतो जम्बुवाविकाग्रामस्तथा दक्षिणतो महासनकाख्यतङ्गागं तथा पश्चिमतोऽक्षोट्टनं तथोत्तरतो वग्धाख्याम एवमसौ चतुराघाटनो पलक्षितः सपरिकरः सभूतवातप्रत्यायः सदण्डदशापराधः सोत्पद्यमानविष्टिकः सधान्यहिरण्योदयः सर्वराजकीयानाम हस्तप्रक्षेपणो यः स चन्द्रार्काणर्वसरित्पर्वतसमकालीनः पुत्रपौत्रान्वयभोग्यः पूर्वप्रदत्तदेवदायब्रह्मदायरहितो भूमिच्छिद्रन्यायेन शकनृपकालातीतसंवत्सरशतेषु सप्तसु चतुस्त्रिंशदधिकेषु महा वैशाखस्य द्वादशदिवसे बलिचरुवैश्वदेवाग्निहोत्रातिथिपञ्च महायज्ञक्रतुक्रियाद्यत्सर्पणार्थं प्रतिपादितः। यतोऽस्योचितया ब्रह्मदायस्थित्या भुञ्जतो भोजयतः प्रतिदिशतो वा क्षमतः कर्षयञ्च न केनचित् प्रतिबन्धना कार्य्या तद्भोगार्थिभिरस्मद्वंश्यैरन्यैश्च सामान्यभूमिदानमवगच्छद्भिर्विद्युल्लोलान्यनित्यान्यैश्वर्य्याणितृणाग्रलग्नजलविन्दुचञ्चलञ्च जीवितमाकलय्य स्वदायनिर्विशेषोऽयमस्मद्वायोऽनुमन्तव्यः पालितव्यश्च। यश्चाज्ञानतिमिरपटलावृतमतिराच्छिन्द्या दाच्छिद्यमानश्चानुमोदते। स पञ्चभिर्महापातकैः सोपपातकैश्च युक्तः स्यादित्युक्तञ्च । भगवतावेदव्यासेन। व्यासेन

विन्ध्याटवीष्वतोयासु शुष्ककोटरवासिनः ।
कृष्णाहयो हि जायन्ते भूमिदायापहारिणः ॥

अग्नेरपत्यं प्रथमं सुवर्णं भूर्वै पृथ्वी सूर्य्यसुताश्च गावः ।
लोकत्रयं तेन भवेच्च दत्तं यः काञ्चनं गाञ्च महीञ्च दद्यात् ॥

बहुभिर्वसुधा भुक्ता राजभिः सगरादिभिः ।
यस्य यस्य यदा भूमिस्तस्य तस्य तदा फलं ॥

यानीह दत्तानि पुरानरेन्द्रै र्दानानि धर्म्मार्थयशस्कराणि ।
निर्म्माल्यवान्तप्रतिमानि तानि को नाम साधुः पुनराददीत ॥

स्वदत्तां परदत्तां वा यत्नाद्रक्ष नराधिप ।
महीं महीभृतां श्रेष्ठ दानाच्छ्रेयोऽनुपालनं ॥

इतिकमलदलाम्बुलोलां श्रियमनुचिन्त्य मनुष्यजीवितञ्च ।
अतिविमलमनोभि रात्मनीनैर्नहि पुरुषैः परकीर्त्तयो विलोप्याः ॥

उक्तञ्च भगवता रामभद्रेण ॥ सर्वानेतान् भाविनः पार्थिवेन्द्रान भूयो भूयो याचते रामभद्रः । सामान्योऽयं धर्म्मसेतु र्नृपाणां कालेकालेपालनीयो भवद्भिः । द्रुतकञ्चाच राजपुत्रश्री दन्तिवर्म्मा । स्वहस्तो मम श्रीकर्कराजस्य श्रीमदिन्द्रराजसुत स्य ॥ लिखितश्चैतन्मया महासन्धिविग्रहाधिकृतकुलपुत्रकदुर्गभ टसूनुना नेमादित्येनेति ॥ अयञ्च ग्रामोऽतीतनरपतिपरीक्षिणान टकश्रीचातुर्विद्याय प्रदत्तो गुणिनेऽपि कुलजजातिविलोपावि च्छिन्नपरिभोगं चौचित्यं श्रीधरामान्यस्य धीविशिष्टत्वम्यभिज्ञत्व तुर्द्विजनेनइतिताम्र पुविन्नोषणापमान परिभोगनुतपानुजानुमो दितः लालाताप्ययन्थेभ्यो लालाक्षतापूलप्रदानपूर्वकालपा एतच्च पतिजाष्ठादत्त प्रकृति कविपिष्टस्य ताज्य श्रीपरमापिता पदा मूलं जानातीति ॥

———

TRANSLATION OF TAMBA PATRA PLATES.

1. May he in whose lily-like navel Brahmá took his abode, and with whose wife's brother (i. e. the moon) Siva is ornamented, protect you.

2. There was a Rája named GOVINDA Rája who was the superior of his race, and the ornament of the *Surastra* kingdom; he was sprung from a spotless line, a hero in enterprize, and most valiant in war.

3. He (GOVINDA Rája) was most gallant, intelligent, and victorious at his first glance over all. His armies were like ploughs rooting up the royal families (of his enemies). He never adored other gods but Siva, the god of gods.

4. From him, anxious to obtain children, was born through the favor of Siva, KARKA Rája, who was possessed of all good qualities. The name was well adapted to him.

5. His (KARKA Rája's) kingdom, (which lost the appellation *Sowrájya* through the ruin that had fallen upon it, but the remains of the splendour of which are esteemed by the universe) was formerly governed jointly by the descendants of this race, but afterwards by him alone.

6. Men were struck with surprise by his restoring the *Vrisha* to its four legs, which had been reduced to one by KALI' (yúga), and by his making it to walk without limping.*

7. It is not wonderful that he governed his people with propriety, (being so gifted); having placed Vishnú as the object of his meditation, he (died and) was succeeded by his son named KRISHNA Rája, who was virtuous, and like the son of DHARMA (JU'DHISTHI'RA): he expelled those who were addicted to evil, for the prosperity of his line and reign.

8. His devotion to Bráhmans was unspeakable and confirmed, and those who were only nominally Bráhmans (i. e. who had fallen off from their religion) resumed their former rites through the greedy desire of obtaining gifts from him, which were due to more perfect Bráhmans.

9. By his constant liberality the minds of his attendants were refreshed like those of farmers by exuberant showers.

10 He who was like a lion among Rájas, and powerful in sovereignty, overcame his boar-like rivals like deers; though their teeth, curved like bows, were radiant with the rays of heroism, and they itched with the desire of fight.

11 The immortals walking on the firmament, being astonished with

* This is a figurative mode of saying "That he restored to virtue the three parts which it is supposed to have lost in the Kali yúga," the word for quarter पाद being the same as for foot, makes the conceit which gives point to this expression.

the view of his fort of *Elapúr*, declared continually that the beauty of that fort was no where to be found but in the works of Swayambhú, Siva, and Bámana.

12. The architect of it was himself struck with wonder at its beauty. His name has been proclaimed every where by the king himself.

13. The image of SAMBHU' (Siva) established therein, though wonderfully ornamented with the symbols of Gangá, the crescent and the kálakúta (a kind of poison), yet was further adorned with ornaments of gold and jewels, and several other materials.

14. His (KRISHNA Rája's) son was DHRU'VA Rája: his enemies, who were humbled by his might, were burnt by the fire of his spirit.

15. He was successful in his endeavours to bring LAKSHMI to submission, how wonderful!! for even SIVA, though lord of all, was unable to make his wife obedient to him without resuming his godhead.

16. From DHRU'VA Rája, who established peace with all his enemies, and who attained the final and the highest rank of gods (dying) at the junction of the waters of *Gangá* and *Yamúná*, immersed in them with remarkable signs, and whose merits covered the universe, was born GOVINDA Rája, who was famous.

17. He deprived all the kings of antiquity who had their communication with different countries of their fame, and destroyed all his enemies.

18. He was in all circumstances irresponsible, and resembled the *Creator* in his conduct, destroying all rival claimants to royalty in his time, and setting them at defiance.

19. He did such wonders in battle, that his foes acknowledged that they had been taught by men ignorant of military affairs. He was like PA'RTHA, the only hero in the three regions who never deprived his enemies of their lives.

20. The elephants of his enemies which came forward in battle and were pierced with his shafts, resembled the wall mountain of the world shaken by the winds at the end of *kalpa* (during the deluge.)

21. His brother INDRA Raja, a king powerful like INDRA, governed the kingdom of *Lâtéshwara*. He performed many wonderful deeds.

22. To this day, the Gods, Kennaras, Síddhas, Sáddhyas, and the Vidyádharas, who have heard of his qualities, are singing his *kunda*-flower-like fame, lost to all sense of shame in their transports, and putting their hands on the breasts of other's females, (i. e. they are so deeply engaged in song that they have become out of sense.)

23. He soon reduced the king of *Gujjara*, who prepared to engage in war with him, and who raised his head with bravery, to fly skulking like a deer, and after plundering all his estates restored him again, out

of compassion, saving his chieftains from ruin who were afraid of (him) and scattered in different places.

24. His (INDRA Rája's) son was the LAKHSMI enticer, whose mind was devoted to the lily-feet of HARA (Siva), and whose spirit was felt by his enemies, like the moon in disposition—KARKA Rája who preserved mankind.

25. There was no robber in his kingdom, nor any sort of mortification, nor famine, nor fear, accidental or natural. All kinds of vice were reduced to a low ebb, and his enemies were humbled; none had the presumption to show disrespect to those who were learned.

26. The owner of *Málava*, in order to defend his kingdom from the invasion of the king of *Gourha* (Bengal) used the (uplifted) hand of KARKA Rája as a stay on the lord of *Gujjara*, and thereby enjoyed all he desired.

27. He having considered life to be fickle as the lightning, and the virtue of giving land durable, executed this religious gift.

28. He, the king of *Lâtéshwara*, possessed of armies and many chieftains, brought into submission in different countries, and in whose reign there was a shower of gold, thus proclaims to all his statesmen, the treasurers, the functionaries, and those who have the care of castes, with the respect due to them.

Be it known to all of you, that for promoting the virtue and fame both here, and in the next world, of his father, and mother, and himself, he, the said Rája, has presented for continuing his five *jagnas* to the Bráhman BHA'NU', who belonged to the line of VA'TSA'YANA, and was acquainted with the four *Vidyás*, and who was a religious student, the son of SOMA'DITYA, the fertile village called PATTANAK, part of the tract containing eighty-four *angkotans* (each 100 begas) bounded on the east by the village of *Jambúbábiká*, on the south by *Mahá Sanaka*, on the west by a *nala (ankootaka)*, and on the north by the village *Bagghachha*. The land within the above boundaries is to be enjoyed with all marriage and other fees from cultivators, with all fishing and fruit privileges, with all that may be washed or deposited by torrents, with all fines for petty offences, with all free labour privileges, with all rights of treasure-trove and mines, without interference of any kind from government officers. It is to be enjoyed in full property as a perpetual inheritance by the said Bráhman, his sons, and posterity for ever, so long as the sun, moon, and rivers, and the mountains shall endure! It is not to be touched by the hands of the king's servants, nor to be claimed on the part of gods and Bráhmans, by whom it was heretofore possessed. Given in the year of Saka's death 734 on the 12th of Bysakh (24th April, 822 A.D.)

Let none obstruct his (BHA'NU'S) enjoying, or letting others enjoy it; or his ploughing, or letting others plough. After this, let future Rájas of our race, or of any other race, reflect that wealth and life are unstable as lightning, and fickle as water in the leaf of water lilies, and so let them respect this our grant, and confirm the grantees in possession. He only whose mind is blackened by the darkness of ignorance will resume, or be pleased at seeing others molest its possessor, reckless of the guilt of the five deadly sins and other heinous crimes, as described at length by VE'DAVYA'SA.

He who grants lands lives 60,000 years in heaven, but he who confiscates or resumes, or allows others to do so, is doomed to hell for a like period.

Those who resume lands granted by others will become black serpents in the dry holes of the forest of the *Vindhya* mountain.

Gold is the first offspring of fire, and the earth the wife of VISHNU, and cows are the daughters of the sun. He who grants these things gives also the three regions.

The earth has been enjoyed by many kings, as the SA'GARA Rája and others, and he who rules it in his turn, is the sole enjoyer of its fruits.

But what generous man will take again the grants made by Rájas who have gone before him, and whose gifts are like wreaths of flowers, spreading the fragrance of a good name, and of the reputation for wealth and virtue.

Oh ye virtuous kings, respect the grants of lands (given by others), for to preserve their grants is better than a fresh donation.

Men whose minds are cleared from sin, considering life and wealth fickle as water in the leaf of the water lily, will never destroy the fame of others.

It is further said by RA'M BHADRA—You who are the best of Rájas, are hereby repeatedly prayed by RA'M CHANDRA to preserve this bridge of virtue for ever.

Confirmed by the counter-signature of the presumptive heir and brother of the king, DANTI VARMA, and signed with the autograph of myself the KARKA Rája, son of INDRA Rája, and prepared and engrossed by the hereditary servant of the king for peace and war, NUNADITYA, son of DURGA BHATTA. For the good of my father and his ancestors have I made this grant to the Bráhman BHA'NU', who has served my family with his prayers for many years. May he enjoy the grant, and profit by it!

N.B. There are several counter-signatures, apparently autographs, in the last four lines of the last plate, which besides that they are of doubtful reading, it would be of little interest to transcribe. On the outside are the words "'Tis for the good of my father and mother."

ART. III.—*Collection of Facts which may be useful for the comprehension of* ALEXANDER THE GREAT'S *exploits on the Western Banks of the Indus (with map).*

By M. A. COURT, *Ancien Eleve de l'Ecole Militaire de Saint Cyr.*

(Translated for the Journal of the Asiatic Society from the French Original M.S.)

The military achievements of Alexander in the regions which lie between the Indus and the Cophenes form one of the most brilliant episodes of his history.

Those regions at present are known by the name of Yousoufzeïs, Kooner, Suwat, Dhyr, Bajore, and Moumends. More northward lies Kaffristan, which occupies the southern and northern sides of the gigantic snow-topped chain of mountains which bounds this country to the north, and is but an extension of the Himalayas, and to the west reaches Hindo-Koosh at the Khound, an enormous ridge, the tops of which are flat, and almost perpetually covered with snow, a circumstance which renders it observable at a great distance: there are likewise visible the banks of the Indus, from which it is about eighty koss distant.

Those regions are bounded on the east by the Indus, on the south by the river of Cabul, which is no other but the Cophes or Cophenes of the Greeks, placed by Arrian at the eastern extremity of Paropamis, and the source of which Pliny collocates in the north western part of this mountainous province, assigning its course eastward, and stating that after its confluence with the Choes near Nyssa, it falls into the Indus to the south west of Taxila below Ambolima (probably *Amb*)—data that perfectly combine with the Cabul river, which I have described in my journey through Affghanistan. This name Cophes, by which it was known to the historiographers of antiquity, seems to have been given it by the Greeks, who may have derived it from *Cophenes* who perhaps then governed the country it washes in the name of his father Artabazus, whom Alexander had appointed prefect of Bactria. This is at least what induced Arrian to adopt the above opinion, who relates that Alexander was accompanied, on his arrival at the banks of the Indus, by Cophes and Assagetes, ὑπαρχοὶ or *sub-rulers* of the province situated to the west of that river. Or perhaps it is the name which it originally bore, and from a corruption of which the Mahometans formed the word *Kaffristan*.

This vast extent of mountainous country is very little known to Europeans. The geographical details which Quintus Curtius gives of it are too succinct, and it is a matter of much regret, that the veracious

Arrian has been incomparably dry, when treating this subject. Add to this the disastrous conquests of the Mahometans, who spread throughout trouble and confusion, besides the custom that prevailed, wherever the Greeks of Alexander's army were to be found, of changing the names of the places which they traversed, and we must unavoidably conclude that it is no easy task for a traveller to discern true from false.

Among the Oriental works (that treat on this subject) we have only the commentaries of Baberch on which we can rely for exact information. The few modern travellers extant are vague and uncertain. Those regions would procure for any European who would survey them, the glory of throwing a brilliant light on Alexander's march, and of enriching science with hitherto unknown facts relative to the Bactrians; in as much as they are overspread with ruins, cupolas, and inscriptions, all referring to those conquerors, and attributed by their actual inhabitants to the Caffrans. They are alluded to by the Chinese Religious, who traversed those countries in the commencement of the 7th century of our era, and whose manuscript exists in the Oriental Library of France. But whatever European may undertake a similar journey, must expect to encounter numberless dangers, and almost insurmountable obstacles from the barbarity of the tribes who inhabit them, and above all from the jealousy of the chiefs, who, naturally suspicious, are always inclined to form sinister judgments of the projects of any stranger who travels through their district. This was the lot of Dr. Henderson, who desirous of crossing those regions to repair to Badakchan, although he was disguised as a fakeer, and had a perfect knowledge of Persian, was seized, stripped, and beaten, for having put his foot in Suwat, and was compelled to return to Peshawur, where I had the good fortune to attend him. Subsequently I myself having become intimate with the chiefs of those regions, had cherished some hope of being enabled personally to explore them; but unfortunately the rank I hold in the army of the Maharajah of Lahore occasioned them so much terror, that they imagined that my researches, far from being actuated by curiosity and an interest for science, were only directed to explore the country, so as to facilitate its conquest by Runjeet Sing. I was thus constrained by their earnest remonstrances to abandon my intention of undertaking such a journey, and to content myself with having recourse to the people of Peshawur to survey secretly the country, so as to acquire some knowledge of its geography.

The items which I have had here transcribed in Persian were collected by them, and I only give them publicity in order to fix the attention of the geographers and archæologists who may happen to come hither after me, and to facilitate thereby the combination of modern

with ancient geography. I may possibly avail myself of these materials hereafter, to furnish a complement to my conjectures on Alexander's marches through Bactria.

The country which I am about to describe, is intersected by three principal rivers, viz. the Khonar, the Pendjecooré, and the Suwat.

The first directs its course S. S. W. along the southern side of the snowy chain above alluded to, dividing Caffristan from the cantons of Bajore and Dhyr, and after rolling its impetuous waters through a bed strewn with rocks, wherein it would be difficult to meet any sand, it falls into the Cabul river, almost opposite the city of Jellalabad. I know not where it rises; some place its source in Cachgar, which it intersects. The proximity of the snowy chain, and the direction of the river's course, denote that it must necessarily have more than one influx. During the liquefaction of the snow it acquires so great a volume of water that it cannot be crossed but on rafts. This river, as I have stated in my memoirs, is denominated *Sind* by the Kaffrees who inhabit its banks, and *Khonar* by the Affghans, a name borrowed from a town that is the capital of a canton or district situated on its western bank, between Jellalabad and Bajore. Some travellers improperly give it the name of *Khameh.** This may be possibly the *Choes* of Arrian, which Alexander coasted on his march to *Suastus*, to which his troops may have given the name of Choes, a corruption probably of that of *Cheva*, a canton situated at its confluence with the Cabul river, which may have anciently given its name to this river, as the town of Khonar gave its own. As the Greeks sometimes translated the names of foreign places, and liked to call them by particular ones somehow connected with the traditions they indiscriminately adopted, they may possibly have *baptized* with the name of Choes one of the rivers of those regions, in memory of the festival of Choes (Χόες) or of the libations which the Athenians celebrated in the month of Anthesterion in honor of Bacchus, and which they also styled Ἀνθεστήρια.

After what Strabo relates, we would be led to suppose that the river in question is his Choaspes, which disembogues, according to him, into the Cophenes.

The Penjecooré rising in Ghilghit, flows between the Khonar and the Suwat: its direction is from north to south. It is called *Penjecooré* because it is formed from the union of *five* other rivers, viz. the Tal, the Laori, the Awchiri, the Neag, and the Jindé; the first of which is the most considerable of the five. Besides those influents, it receives

* This river is marked "*Kama R.*" in Tassin's map.

several others of inferior note, such as the Berravol and the Caron ; the latter intersects the district of Penjecooré between the Awchiri and the Suwat.

The river of Penjecooré is the most considerable in those regions next to that of Cabul ; hence I have to say of this also, that during the liquefaction of the mountain snows it cannot be crossed but with rafts. Without being very deep its current is extremely rapid, and its bed is so sown with rocks and slippery stones, that of ten persons that wade it when its water is low, half are sure to stumble. After leaving Dhyr until its confluence with that of Suwat, it is known by the name of Penjecooré, and thence, until its union with the Cabul river, by that of Suwat.* I am inclined to think that it is the *Guræus* of the Greeks.

Respecting the Suwat, I am at present unable to speak of it, being occupied at this very moment in getting its source explored. The Hindoos only know it by the name of *Sihon pedra nadi.* The latter is undoubtedly the *Soobah Vastoo* of the Chinese Religious, and the *Suastus* of Ptolemy. I would have it here observed, that the Suwat and Penjecooré rivers are frequently confounded with one another by the inhabitants themselves of lower Yousoufzeïs, because they mix their streams before they disembogue into the Cabul river, i.e. the Cophenes. This mistake only takes place below their confluence, which occurs at the point of Goozar Mamani, situated six or eight koss from the ruins of Talache, in as much as above it they retain their distinct denominations.

The Suwat is indisputably the *Suastus* of Arrian, on which Alexander sailed after coasting the Choes.

Of a vast number of ruined cities which those regions present to one's view, those that most deserve the attention of geographers and archæologists are the following :—

1st. The ruins of *Talache*, situated between the confluence of the Penjecooré and the Suwat. In the midst of these massy and immense ruins exists an enormous cupola, of much more elaborate architecture than other monuments of that description, because it is said to support around its base a number of *basso relievos.*

2nd. The ruins of *Berikoot*, attributed to the Caffre Béri, on the eastern side of the Suwat, not far from the city of Manglore, or Mangar, near which is the cupola of Chinguerdar, attributed to Abou-Padsha, and equally remarkable with that of Talache. A beaten

* "*Lundye river*" of Tassin. The "*Penjecooré R.*" of M. Court has no representative in Tassin.

track through a rock leads to those ruins which are delineated on the back and top of the mountain. Farther on, on the same grounds, are those of Hira and Badakhel: the latter, being the vastest of all, are assigned to Doomma Padsha.

3rd. The ruins of the city of *Aritchend*, improperly denominated *Artchend* by the Mahometans. They are observable on a height environed on all quarters by deep ravines. They are eighteen koss north of Peshawur, and six east of Fengui. They are attributed to the Kaffrans, and may possibly be the *Arigæum* of the Greeks, which was razed by them, and whose advantageous position induced Alexander to order Craterus to demolish its walls. To the west of these ruins, and on the western bank of the Suwat and Penjecooré united, lie those of Khound, which reach down to the river.

To the north of Aritchend are the ruins also of *Sakout*, where the impression of a foot is visible, and those of Diguer, situated on the southern side of mount Malekan. To the south of Aritchend are also observable those of Radjer, or Razor, of Seidabad, and Kalader: they are attributed to the Caffre Farikhi.

4th. We cannot consider with equal attention the ruins of Béhi, attributed to the Rajah Verrat, which according to the inhabitants of the place were the former sojourn of the monarchs of that country. They lie to the north east of the present city of Achtnagar, and are situated on the level of mount Béhli, insulated as it is, in the centre of the immense plain of Yousoufzeïs. There are visible there, it is said, grand traces of massy walls, some *basso-relievos*, and the ruins of a subterraneous aqueduct, (which conveyed thither the water of the Penjecooré) after leaving the ruins of Radjer situated close to Achtnagar. Directing your course thence towards Booner you meet, at twelve koss distance, mount *Mahram* which contains also some ruins, and may probably be the *Meros* of Arrian, which Alexander ascended with all his army after taking possession of Nyssa, by our geographers supposed to be identical with Achtnagar. But what destroys this probability is, that the district the Macedonians recognised with jubilee is not discoverable in those parts, and cannot be traced out, but in a more northern latitude beyond the Malekan ridge. I must however here remark, that there are several mountains in those regions called *Mahram*, and among the rest one in Bajore, and another at Cashmeer close to the city.

5th. The ruins of *Meidan*, where a rather unimportant inscription has been reported to me to exist, merit not to pass unnoticed, in consequence of their extent and proximity to the Penjecooré. The same must be said of those of *Ganchal*, situated in the canton of Tal, three days journey north east of Meidan, and twelve koss from Dhyr, as well as

from the castle of Soun, observable to the south of the river Awchiri, and containing lead mines in its vicinity.

6th. The ruins of *Doomma*, situated on a very lofty mountain, whence the surrounding country is discernible; those of Dankool are a little further up. Those cities bear the names of the monarchs that founded them, and are situated in the eastern part of the Yousoufzeïs, not far from the Indus.

7th. I shall draw attention in the last place to the ruins that are two koss to the west of the present town of Dhyr, and which are assigned to the Kaffrans, who were dispossessed of them by the Mahometans, when that city was governed by the Caffer Kirkat. These merit that the greatest attention should be paid to them by travellers, in as much as, after the relations of Kazan Khan, chief of Dhyr, and on account of the combination of the latter name with the *Dyrta* of Arrian, I have scarcely any doubt on my mind that this is the city which Alexander passed, when he was pursuing the brother of Assacanus, and whence he set out for the Indus. If my opinion could be borne out, with such a cue it would be extremely practicable to determine the true positions of Ora, Bazira, Massaga, and other places mentioned by the above historian, concerning which I have been unable to obtain any precise information, notwithstanding the thorough researches I have made. Nevertheless I shall observe that the Hindoos of those districts assured me, that a city called Massangar, known also by the name of Maskhiné, exists on the southern frontier of Kaffristan, close to Baba Kara, twelve koss from Bajore, and four from mount Mahram, which is in that canton. They also added that the tribe called *Assacenis* exists in that country. If such a relation were well-founded, we should discover there the Massaga of the Greeks, the capture of which cost so much blood to Alexander, and the massacre of whose intrepid garrison cast a blemish on the exploits of that conqueror. I am not aware if this Massangar be identical with the one alluded to by Forster, who travelled through Suwat.

I have been similarly assured that there exist in the district of Booner the traces of a town called *Oora*, which has been also denominated *Doora*, and which on account of its proximity to the Indus may probably be the Ora of Arrian, (although Bazira has not been yet discovered in its vicinity) especially as that river is not known higher up, but by the name of *Ab Sind*, whence it may be conjectured, with some probability, that the country it washes in that part may have been the region of that Abissares, on whom our historians waste so many hypotheses, and who, according to Arrian, sent resources to Ores, when Alexander was besieging that city. *Apropos* of Abissares, I do not deem it here

superfluous to remark that there is a mountain two days' journey N. of Dhyr, by name *Ser-Adkamoos-Ouré*, situated on the route leading to Badakchan, a region near which is a place called *Hissar*. This latter word in Hindee signifies a *fortress*, whence the present city of Achtnagar is also known by the name of *Hissar*.

I had also had scrupulous researches made concerning the *Aornos*, but with similar mal-success. Alluding to this rock, I have already observed in my journey through Affghanistan that a similar mount presents itself (with all the peculiarities described by Arrian) in the canton of *Naoghi*, near Bajore, where the vestiges also exist of a city named *Ambar*, which is probably the Ambolima of Ptolemy, placed by him on the lower branch of the Choes or Cophenes.

The persons I commissioned to explore the country about Dhyr reported to me, that in the canton of Laori, near that of Dhyr, there exists a mountain corresponding in all its particulars with the Aornos. Others have assured me that there is a similar one in the canton of Booner, a region, like all the rest of Yousoufzeïs, interspersed with insulated mountains, whither the inhabitants take refuge in case of imminent danger, and which, considering the proximity of the city of Amb, capital of a canton situated on the Indus, renders such an opinion sufficiently probable. I must also subjoin, that beyond the territory Mola Goori, situated below the confluence of the Penjecooré and the Suwat, to the west of both those rivers united, a mountain is observable called *Salata*, and also named *Azarno*, which on account of its insulated position and elevated form, resembling a flattened or headless cone, may be easily taken for the Aornos. This mount is quite perceptible from Peshawur, behind the defile of Fengui, as its summits far surpass the Malekan ridge. I shall also observe that on mount Guendeguer, to the N. E. of Azerou, places situated to the east of the Indus, there is the fort of *Serikoot*, a name bearing a striking resemblance to that of *Sisicotte*, to which Alexander confided the garrison of Aornos. The former is a renowned stronghold of those regions, having cost the Seiks a great deal of blood, and being the place whither the inhabitants of the surrounding countries resort for shelter in cases of peculiar peril.

After surmises of this sort, we must infer that it is extremely difficult to know which opinion to embrace, especially as the ancient historians themselves are not agreed on this important point, which constitutes one of the most brilliant of Alexander's exploits. Arrian collocates Aornos near Bazira; Strabo towards the sources of the Indus; and Quintus Curtius on the banks of that river. With reference to the latter opinion, I would observe, that a rock exists opposite

Attok, with all the peculiarities described by him, on a mountain that is topped by a castle, attributed to Rajah Hody. It cannot be ascended but on the side of the Indus, by a steep passage hewn through the rock, and enclosed by two walls of defence, running up zig-zag according to the protuberances of the mount. The space immured by those walls is filled with ruins of habitations gradually rising from the brink of the river up to the castle. Those works are all entire, and have the appearance of great antiquity. The three heights whereon Alexander sacrificed to the gods still exist, but I must avow that no arable ground or spring can be discovered. There are only two reservoirs built by the vizier of Zamenchah. The heights are at present occupied by small forts defended by the *Mazbis*, an Indian sect in the service of the Maharajah of Lahore.

Of the great number of cupolas existing in those regions I shall distinguish the following :—

1st. That of Talache, which I have already alluded to, and the five or six others that are discoverable not far from those ruins, in the defile that leads from the Suwat to the Penjecooré.

2nd. That of Chinguerdar, situated between the ruins of Berikoot and the town of Manglore. Another is observable more to the southward.

3rd. That of Charbag, present capital of Suwat.

4th. Those that exist among the ruins of Sedougan, to the east of Manglore.

5th. Those of Berikoot, situated near the village of Nakmira.

6th. That of Charkootliá, fifteen koss to the east of Aritchend, as well as that near the ruins of Seidabad. The latter is as large as that of Chinguerdar.

7th. That of Sepel-banda, near the village of Kharí, and as large as that of Chinguerdar.

8th. Those of Heniapoor, one of which is near the village of Fooraseuk, and the other under mount Jaffer.

9th. That near Sonigheran.

10th. The two existing on the ruins situated at the foot of mount Sookker, near the village of Riga.

11th. Those in the villages of Fakttahind and Caboolgheram.

12th. Those, in fine, of Chammely, situated on the top of a mountain.

All those massy cupolas which I am describing, are in the Yousoufzeïs territories, by which is meant all the territory comprised between the Indus and Penjecooré, from the snowy chain to the lower branch of the

Cabul river, viz. the Cophenes, and which includes Yousoufzeïs proper, Booner, upper and lower Suwat, Penjecooré, and the dependencies of Dhyr.

Remarkable places being points that may serve for comparative geography, as well as rivers and mountains, I shall select the following for observation :—

1st. The cave Cashmeer Ghar, situated in the territory of the Baboozeïs, on a mountain which cannot be ascended but by a steep passage, hewn in a great measure out of the rock. This place is also called Pelley, and is sixteen koss from the town of Soukhor. The cave is said to be of an immeasurable depth, and to have so large an aperture, that it is impossible to discern the direction by casting in a stone. As both sides of the entrance are of solid masonry, and the front is encumbered with enormous cut stones, one would imagine that it is one of the subterraneous temples attributed to the Pandoovans, or to the Caffers. At present it is a place of shelter for myriads of wood-pigeons. Quite close to it are visible the traces of a town or castle, whence idols are sometimes dug up ; a basin also is observable there continually supplied with water. I had been assured that an inscription was discoverable, but my men could trace out none whatever. I am not aware if this cave be identical with that of Roostam, to which I have alluded in my description of Yousoufzeïs.

2nd. The sandy cave of Dekia, situated at the foot of mount Ghardoom in the district of Dhyr, on which there are the traces of a town.

3rd. The Khial cave, near the ruins of Meidan, in the canton of Bajore.

4th. The vast basin that exists on mount Bikary, to the west of Dhyr, being a place of pilgrimage for the Hindoos, who give out that their *Pir* disappeared on that spot.

5th. The basin situated to the east of Dhyr in the district of Tal, where a fire exists under a cupola maintained from time immemorial, and kept up at present by a Guebrian woman.

6th. Lake Mansoroor in Bajore, situated on a mountain fifteen koss from Bendy Berravol, which is continually supplied with water in consequence of the perpetual snow.

7th. Mount Hilo, situated in Yousoufzeïs, by the Mahometans denominated *Hilum Pilum*, and by the Hindoos *Ramtakt*. This place is much frequented by the latter, who perform an annual pilgrimage thither during the month of April, in memory of Rajah Ramtchend. Those Hindoos likewise make the pilgrimage of Chamra, situated near Ootchan, country of the Samoozeïs

Prior to my drawing this article to a close, I deem it an interesting topic, to make an observation on the region of Tchêlas, situated on the eastern bank of the Indus, four days' journey (more northward) from Pakhley and Dembor. This region is said to be highly remarkable for the number of ruined towns it contains. Although situated in the neighbourhood of the snowy chain, it may well have been the *Taktcha-shilas* of the Chinese Religious, a word which may be decomposed into *takt*, a throne, *chah*, a king, and *shilas* a corruption of *Tchelas*; and thus form a ground for a probable hypothesis, that the Greeks thence derived their *Taxila*. The inhabitants of Upper Suwat who repair to Tchêlas, cross the Indus at Goozer Chekhi, whence is visible on the eastern bank mount Mehoor, situated almost opposite the Cabool-Gheram ruins, which are discoverable on the contrary beach.

Higher up, on the upper branch of the Indus, lie the regions of Ghilghit, Ashoor, Goræi, Khélooman, and Balooman, formerly inhabited by the Caffers.

The ferry points of the Indus from Attok to the snowy ridge are the following: Attok, Bazar Hound, Monarí, Pehoor, Notchy, Kabbel, Chetabha, Amb, Derbend, Chetterbahi, Mabera, Toohara, Marer, Didel, Kamatche, Behar, Pachetlehi, Guendoo, Mattial, Battera, Jendial, and Manial, Kallehi, Palles-pattan, Pohoo-Goodje, Koonchir and Jalkoot.

Art. IV.—*Remarks upon the Rain and Drought of the last Eight Seasons in India.* *By the* Rev. R. Everest, *Landour.*

In two former papers I endeavoured to trace the variations of the past seasons, as to drought and moisture, by means of the prices of corn, having assumed that the wettest years produced the most abundant harvest, and the driest the reverse. An examination of the subject shewed that the more extensively the averages of prices were taken, the greater approximation there was to a regular ascending and descending series, or curve, with recurrent periods of from six to ten years; thus leading to the belief, that, if the average of certain atmospherical phenomena over a surface sufficiently extensive could be taken, the result would exhibit recurrences nearly or altogether regular. I will now shew how far the Register of the different Rain Gauges corroborate or not this opinion. The following are the annual depths of Rain that have fallen in different parts of India during the last eight years.

	Calcutta, inches.	Madras, inches.	Bombay, inches.	Dehli, inches.
1831	58·78	40·30	99·64	..
1832	50·25	20·07	78·20	..
1833	60·36	36·99	71·00	14·15
1834	68·73	40·17	66·59	36·85
1835	85·50	37·26	62·19	27·70
1836	45·66	47·59	87·99	35·00
1837	43·61	49·27	64·99	10·55
1838	53·02	54·33	50·78	20·31

To obtain the average variation, let us take the maximum and minimum at each place, and divide the whole difference between them into one thousand parts; then for the number itself substitute the proportional part of the difference.

	1835	1837
Thus at Calcutta we have	85·50	43·66
	1835	1837
These will by the proposed substitution become ...	1000	000

and the whole will stand thus:—

	Calcutta.	Madras.	Bombay.	Dehli.	Average.	
1831	362	295	769	..	475	
1832	158	000	441	..	200	—
1833	400	246	452	137	309	
1834	600	293	401	1000	573	
1835	1000	250	352	652	563	
1836	050	401	635	929	504	
1837	000	425	376	000	200	—
1838	225	499	216	371	323	

It appears from this average that the minimum has recurred in five years, which is a period somewhat shorter than we should have been led to expect from an examination of the prices of corn for many years back.

I have before stated, as one of the results of such an examination, that there was a more perfect recurrence at the end of fifty six years than at any other period. Thus comparing together different years with that interval between them, we have the following:—

Maxim: or years of abundance. .....1815.....1822-23.....1829.....1835-36
.....1759.....1767 1773

Minim: or years of scarcity. .....1819-20.....1826.....1832
.....1763 .....1770.....1776

In searching for data to elucidate this part of the subject, I obtained sight of an old manuscript Register in the Surveyor General's Office, from which I was enabled to compare the annual amounts of rain for the last eight seasons with those fifty-six years before. The Register appears to be imperfect, and, unfortunately, to have been kept by an illiterate person. The daily entries begin towards the latter end of 1776, but, from a note we learn what had been the annual amount of rain both in that year, and in the year previous. I here subjoin them, and place by the side of each the depths registered 56 years afterwards.

Annual depth of rain at Calcutta in inches.

	Rain inches		
1775	55·24	58·78	1831
—1776	39·26	50·25	1832—
1777	62·07	60·36	1833
1778	59·30	68·73	1834
+1779	64·51	85·50	1835+
1780	64·20	45·66	1836
1781	59·90	43·61	1837—
—1782	41·07	53·02	1838
1783	52·22	....	....
1784	51·58	....	....
+1785	69·75	....	....

It will be observed that the depths are much less in the earlier period than in the later. This is partly owing to the height of the Gauge above the ground in the former case, for which allowance might be made, but this would not be worth while, as there are other sources of error which could not be calculated. For the years 1784-85 we have another register published in the Asiatic Researches, which gives the annual amount thus :—

Year,	1784 ..... 1785.
Inches,	81·0 ..... 77·5

Let us now recapitulate the principal *maxima* and *minima* for 56 years. They are—

Max. 1779...1786...1796...1806...1815...1822–23...1829...1835–36
Min. . . 1782–3...1792–3...1802...1811–12...1819–20...1826...1832

The *maxima* for Bengal are generally earlier than the above. They are, 1784–5 1794 1804 1813.

On referring to the list we see that no *minimum* recurred at the end of 56 years from 1782 viz. in 1838 ; but somewhat earlier, viz. in 1837. It was not, however, to be expected that the recurrences would happen regularly in the same locality, and our lists are much too few to enable us to estimate the average effect over the whole surface of the country. The *maxima* above stated shew very nearly four equal intervals of seven years each = 28 years ; one of ten years, and two of nine years each = 28 years.

Admitting the case to be as we have supposed, then we might reasonably expect that similar phenomena would be observed in other parts of the world, in particular, such lakes or large natural reservoirs as the Caspian, and the North American lakes would indicate, by their increase or diminution, the variations of the seasons over an extended surface, better than any other artificial means that could be devised. In Brewster's Edin. Journal of Science, vol. 7. 1827 (July to October), we find a paper by Mr. De Witt Clinton, on the periodical rise and fall of the North American lakes. Unfortunately no record has been kept of the changes, but it is stated that there is a rise for three years, and a corresponding declension—being altogether a period of six years. It is added, that some extend the time of rise to five, and others to nineteen

years. Probably these periods would be more correctly stated at $4\frac{2}{3}$ and $9\frac{1}{3}$ years respectively, which would give recurrences at the end of nine and nineteen years. Some particular times of *maxima* and *minima* are stated; they are—

Max. ..... 1797 ... ... 1815.
Min. ... ... 1802–1811 ... ... 1822.

These numbers (except the last) nearly coincide with our own, which are for the same period—

Max. 1796 ... ... 1806 ... ... 1815 ... ... 1822.
Min. 1802 1811

It must be recollected that these periods of the North American lakes are only stated from the memory of the inhabitants; and besides it is almost too much to expect that the changes in distant parts of the world should be exactly contemporaneous.

ART. V.—*Statistical Record of the duration of diseases in* 13,019 *fatal cases in Hindoos.—Extraordinary mortality among Lying-in Women—Compiled by Dr.* DUNCAN STEWART, *Superintendent General of Vaccination.*

NOTE. The Table is compiled from the Bills of Hindoo Mortality kept by the Police authorities at the different ghauts where Hindoo obsequies are performed. The information is derived from the relatives accompanying the body to the ghaut, and is therefore not liable to suspicion, although there may be some little laxity on particular points. The registers thus obtained assign the name, age, sex, caste, occupation, and residence of every individual—the illness whereof he died, and the number of days he was ill—also the names of his father, of his nearest heir, his priest, and the doctor who attended him. Some of the former items I have elsewhere tabulated for the information of the Municipal Committee, in illustration of the localities in Calcutta most favorable

to the generation and concentration of disease, and of the ratio of mortality in each Thannah, as also the influences of age, sex, and season upon the course of disease among the natives.

The present Table has reference chiefly to the comparative prevalence of particular diseases, and to the duration of these in a majority of cases before they *kill*. It must be remembered that none of the subjects here classified enjoyed the benefits of Hospital treatment, and but very few probably of Dispensary aid, or of European skill in any form; yet the Table will be interesting, if on this account alone, by exhibiting in comparison with similar Tables, the results of Hospital or Dispensary practice here and in Europe.

The rapid fatality of tropical diseases in their early stages, is remarkably shown; and with reference particularly to the diseases of child-bed, there is more than sufficient to compel the conviction not only of the existence of many unhappily fatal habits and prejudices on the part of the people, but of most barbarous, perhaps sinful, obstetricy on the part of the practitioners. The mortality in child-bed is *one-tenth* of the whole; that is, equal to one-fifth of all the deaths among females. Of the fatal cases, more than half occur during the three first days, in other words "in the birth," and of the remainder a large majority fall victims to puerperal diseases within 15 days. So frightful a picture is not to be met with in the records of humanity; yet so little has it been known or suspected, that only two years ago the India Company's examining Physician in London actually struck out of the medical indent from this country the entire of the obstetric instruments, stating as a reason, that "the relaxing effects of the climate rendered the use of instruments at all times unnecessary."

The subject has lately attracted attention here in an influential quarter, and such disclosures as the present will, it is hoped, lead to the institution of measures calculated to prevent the fearful waste of life from such causes.

[*Table shewing, &c.*

Table shewing the Duration of particular Diseases in 13,019 *fatal Cases among Hindoos.—Calcutta 29th May,* 1839.

	Number of Days the disease existed before Death.																													Ditto of Months.											Ditto of years.			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	1	2	3	4	5	6	7	8	9	10	11	1	2	3	Total.
Cases of Dysentery.	..	2	2	3	3	2	3	1	2	9	4	13	2	4	22	5	4	..	2	11	..	1	..	2	4	..	..	..	..	77	60	33	11	10	22	4	6	1	10	1	17	7	2	362
Simple Fever.	2	..	9	7	13	13	7	21	4	15	9	10	5	2	18	3	2	5	1	4	1	1	1	1	1	..	..	..	..	73	82	60	34	9	44	10	18	3	2	1	33	22	4	550
Typhus Fever	50	100	239	269	308	258	364	561	299	476	300	356	177	178	236	109	91	90	62	125	105	68	15	12	39	8	10	10	1	153	42	..	2	..	2	..	..	..	..	..	..	..	..	5,115
Small Pox.	..	4	6	6	12	17	18	19	36	24	30	44	55	69	50	25	17	13	4	11	12	6	..	2	3	3	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	488
Cholera.	918	2211	900	347	158	74	44	56	11	17	9	15	3	..	7	1	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4,773
Childbed disease.	356	208	146	88	89	49	46	42	29	36	30	32	23	23	58	7	3	2	7	2	19	10	..	2	3	1	..	..	..	14	2	1	..	..	..	..	..	..	..	..	..	..	..	1,328
																																											13,019

D. STEWART, M. D.
Surgeon to Park Street Dispensary.

We propose to return in our next Number to the consideration of the subject which Dr. Stewart, has laid before us in such an appalling form.—Eds.

ART. VI.—*Summary description of four new species of* Otter. *By* B. H. HODGSON, ESQ., *Resident at Catmandu, Nepal.*

To the Editor of the Asiatic Journal.

SIR,

One of the most remarkable features of the mammalogy of Nepal is the great number of distinct species of *Otter* characterising it. There are at least seven species, I believe, though not one of them is numerous in individuals, at least not in comparison of the common Otter of commerce, which is produced in the neighbourhood of Dacca and Sylhet. This rarity of species, added to the circumstance of the animals not being regularly hunted for their skins, renders it very difficult to procure live specimens; and without live specimens—which may be slain and their osteological as well as other characters thus accurately examined—the discrimination of specific differences is a work of extreme labour and delay. Many years ago I announced to Mr. Bennett, the late Secretary of the London Zoological Society, the fact that there are several species of *Lutra* in Nepal, and before he died he was nearly convinced of the correctness of the statement, though I could not then, nor can now, give a full exposition of even those with which I am best acquainted.

Waiting, however, for the perfect knowledge when the materials of it are not under command, is, I find, like waiting on the river's side for a dry passage after the waters have flowed past; and I shall therefore offer no apology for briefly characterising those four of the seven Nepalese species of Otter of which I have considerable certainty, leaving the remaining three to some future occasion.

GENUS LUTRA.

1*st. Species*—TARAYENSIS NOBIS.

Size, medial. *Structure*, typical. Scull and head much depressed. Lower incisors ranged nearly in line. Tail equal to two-thirds the length of the animal, and much depressed. Form, robust. Nails compressed, exserted from the finger ends, and acute. Fur short and smooth. *Colour*—above, clear umber; below, and the hands and feet, pure yellowish white; the yellow tint deepest on the limbs; the pale colour on the head and neck extending upwards to the line of the ears—less so on the body; and the distinction of dark and pale hues very decidedly marked. Tail above and below, dark.

2d. Species—MONTICOLUS NOBIS.

Size, large. *Structure*, upon the whole, similar to the above. Tail equal to more than two-thirds of the animal, and less depressed. Scull and head less depressed. Intermediate incisors of lower jaw ranged entirely within or behind the line of the rest. *Colour*—above, deeper than the above, or bistre brown; below, sordid hoary, vaguely defined, except on the edge of the lips and chin; limbs nearly as dark as the body. Fur longer and rough, or porrect from the skin in a considerable degree.

3d. Species—INDIGITATUS NOBIS.

General form and proportions of *Leptonyx*, to which it is affined. Habit of body more vermiform than in the above. Tail but half the length of the animal. Toes very short, and more than half buried in the palmary mass. Nails short and worn, but not depressed nor truncated, as in *Leptonyx*. *Size*, medial. *Colour*—same as in the last, but deeper still, or dusky bistre; paler and ruddier on the body below, and albescent on the head below; but the colours not well defined, and only really distinct (except in shade) on the inferior surface of the head. Character of the fur as in the last, and indeed in all the mountain species.

4th Species—AURO-BRUNNEUS NOBIS.

Size, small. Habit of body still more vermiform. Tail less than two-thirds of the length of the body. Toes and nails fully developed. Fur longish and rough, as before. *Colour*—rich chesnut brown (the fruit) above; and golden red below and on the extremities.

Remarks.—The three last species are confined to the mountains, as is the first species to the plains at their foot. The dimensions in inches, and the weight of the four species are as follow:—

	1	2	3	4
Tip of snout to base of tail .	26 to 28	30 to 32	22 to 24	20 to 22
Tail . . .	16	20	10½	12 to 13
Weight .	16 to 20 lbs.	20 to 24	11 to 13	9 to 11

I am, Sir,
Your obedient servant,
B. H. HODGSON.

Nepal, May, 1839.

ART. VII.—*On the Geographic Distribution of the Vulturidæ, Falconidæ, and Strigidæ; being the first of a series of memoirs intended to illustrate the Geographic Distribution of the Ornithological Kingdom.* *By* WM. JAMESON, ESQ. *Assistant Surgeon Bengal Medical Service, &c.*

Of all the departments of zoology, there is probably not one which has attracted less the attention of naturalists than that of the geographic distribution of the animal kingdom; although from a study of it many details may be derived of essential importance to several of the other branches of natural history. To elucidate partially the distribution of one division of zoology, viz. ornithology, is the subject of the series of memoirs intended to be presented to the Society.

In entering upon a subject like the present, we do so with the greatest diffidence, from the confusion which has existed, and still reigns in the systematic department of ornithology. The number of synonymous genera—some authors applying a certain suite of characters to a particular genus, others another suite either more or less extensive, and some applying the name, but at the same time ignorant of the characters upon which the genus is based, of which we have many examples, and these too in works published at the present day—have presented to us difficulties of no ordinary nature. To overcome these, we have examined minutely the magnificent collection in the Edinburgh Royal Museum, as well as the principal public and private collections throughout England.

The system of arrangement we have adopted is that of the Baron Cuvier, with certain modifications, which is undoubtedly the best at the present moment. The system of Macleay, when properly followed out, will probably however supersede all others. The attempts which have as yet been made are very unsatisfactory, the best is that of Vigors. Mr. Swainson in trying to find out his analogies, does not on many occasions at all take into consideration the possibility of many groups of birds having disappeared from the surface of our globe. His views, no doubt, are very ingenious, but must be received with due caution. We have adopted several of the new genera lately proposed by Vigors, Lesson, Swainson, &c. these we shall notice in their proper place.

When we take a general view of the ornithology of Asia, Africa, Australia, North and South America, we find that it is in a manner unknown. Of Europe and North America we have no doubt complete lists of the species, but the remarks on their distribution are of a loose, and unsatisfactory nature. The local *Faunas* published are few in

number, and in general they have not been drawn up with that care and precision, and upon the system, now necessary, authors being content in mentioning the mere occurrence of the species. In regard to the birds of Britain, we have some good details in the works of Montague, Yarrel, Fleming, Selby, Jenyns. Again the works of Temminck, Naumann, Buhm, Berger, Gould, &c., afford us some valuable information upon the birds of Europe generally. The ornithology of Asia has not attracted the particular attention of any naturalist, at least we have no complete work. In the writings of Horsfield, Raffles, Sonnerat, Leschenault, Duvaucel, Diard, Sykes, Vigors, Franklin, Gould, Hodgson, Dussumier, Belanger, Boié, Kuhl, Van Hasselt, &c.,—some of whom forfeited their lives in the pursuit of this their favourite study—we have many valuable details.

In regard to the birds of Africa, the works of Le Vaillant stand pre-eminently forward, and which have increased much our knowledge in this department; but his researches are almost entirely confined to the southern part of that continent. To Dr. Smith we are also indebted for much valuable information, and we look forward with much interest to his work, which is soon to issue from the press. Mr. Swainson has added a little to our knowledge in regard to the birds of western Africa, but there is still a vast deal to be done in this quarter. Ruppell has published some excellent observations on the birds of Nubia and Abyssinia, and the ornithology of Egypt has been partially elucidated by Savigny in his great work.

To Australia the same remark applies. We have no complete general work. From the writings of Brown, Lewin, White, Vigors, Horsfield, King, Phillips, Lesson, Quoy, Gaimard, Poren, Lansdorf, Gould, much valuable information may be obtained. The last individual mentioned is at present engaged publishing a work, illustrated with figures of the heads of the birds of New Holland, and we hope soon to have a complete *Fauna* from the same author, who is at present travelling through that country in order to illustrate its zoology.

The northern half of the new world has received much greater attention, and its ornithology is better known than any other continent with the exception of Europe. For this we are indebted to the indefatigable exertions of Wilson, Audubon, Prince Lucien Bonaparte, Nuttal, Ord, Richardson, Swainson, Sabine, Ross, Douglass, Lichtenstein, &c.

With regard to the ornithology of the southern continent of America, we are lamentably deficient in information. From the writings of Spix, Prince D'Neuwied, D'Orbigny, D'Azara, Swainson, some information may be obtained.

From numerous general works much valuable information may be received, to notice all of which would occupy too much space. Among the authors we may mention Temminck, Cuvier, Latham, Shaw, Buffon, Vieillot, Lesson, Wagler, Jardine, Selby, Drahiez, Lichtenstein, Illiger &c. To Illiger, however, we are indebted for having first taken up the particular subject of ornithological distribution, and which he has handled in a masterly manner, in a paper published in the transactions of the Royal Academy of Berlin; nor did he direct his attention to the distribution of the ornithological kingdom alone. In the same transactions we find him discussing mammalia in a similar manner. Illiger, however, in his paper on birds only notices the distribution of about three thousand species, being little more than one-half of what is now known; and, moreover, most of his observations are now inaccurate, our information in this department being much more extensive. Prince Lucien Bonaparte has lately published some observations upon this subject, but probably too general to be of much value; and, lastly, we may state that Mr. Swainson has lately devoted some attention to this subject, with what success, we shall afterwards have occasion to point out; in the mean time we may remark, that most of the observations which he has published seem to be more for the purpose of supporting a favourite theory, than tending to advance ornithological geography.

We cannot omit noticing that several excellent monographs of particular families have been published, among which we would particularly mark out those of Wagler and Kuhl, upon the *Psittacidæ*—Lesson on the *Trochilidæ*—Gould on the *Rhamphastidæ* and *Trogonidæ*—and also Wagler's System a Avium, which may be considered as a series of monographs brought into one focus. A continuation of this work will be found in Oken's Isis. Numerous papers on genera and species have been published in the transactions of various Societies and Periodicals, which however we shall notice when we have occasion to consult them.

Having now given a rapid sketch of the present state of ornithology as far as the distribution of birds is concerned, we shall proceed to the subject of our communication.

Birds, considered geographically, may be divided into four grand divisions, viz. 1st. Those which are universally distributed; that is, found in all the great continents of the world. 2nd. Those which are generally distributed, or found in three or more continents. 3rd. Partially distributed, or those found in two continents. And 4th. Continently distributed, or those found in but one continent; which last division may be again subdivided with those which are generally distributed throughout the continent, or confined to a part, or island, belonging to that continent.

For these four grand divisions which we have now proposed, and for the purpose of simplification, and to prevent repetition, we have adopted the following terms:—To the first division we apply the term *Katholiko-dianamial;* to the second, *Geniko-dianamial;* to the third, *Adiko-dianamial;* and to the fourth, *Topiko-dianamial.*

In illustration of this arrangement, which we think, in conjunction with a continual tabular view, is well adapted for tracing the distribution of the ornithological kingdom, we may notice a few examples. Belonging to our first, or *Katholiko-dianamial* division, we have the genera *Falco, Turdus, Anas, Columba, Fringilla, Muscicapa, Corvus, Hirundo, Ardea,* &c. To our second, or *Geniko-dianamial* division, belong the genera *Vultur, Picus, Mycteria, Phœnicopterus, Trogon, Upupa, Oriolus, Tetrao nacifraga,* &c. To our third, or *Adiko-dianamial* division, belong the genera, *Bucco, Trochilus Ocypterus, Accentor, Buceros,* &c. And to our fourth, or *Topiko-dianamial* division, belong the genera *Sericulus, Buphaga, Eurylaimus, Menura, Alectura, Musophaga, Calyptomina* &c.

No doubt objections may be thrown out against the system of arrangement now proposed, in particular in regard to the last two divisions; for in nearly all the continents we have tropical, temperate, and arctic climates; and it is seldom that genera extend throughout all these; nor do we mean to infer this; all that we suppose is, that species belonging to any particular genus noticed extend more or less over that continent.

Birds of prey from the most early times have been divided into two grand divisions, viz. the Diurnal and the Nocturnal; the former comprehending the Vultures and Hawks; the latter the Owls. We shall therefore first notice the Vultures.

Vultures taken as a whole belong to our second, or *Geniko-dianamial* division, being found in all the continents of the world, with the exception of New Holland; true Vultures never being found in it, as far as we are aware, their distribution not extending further in that direction than the Indian islands. No doubt Mr. Swainson has described his rasorial type of the Vultures as peculiar to this continent. With all due deference to Mr. Swainson as a naturalist, we cannot but state that we have here a most extraordinary instance of the danger of being misled by a favourite theory, for in this instance Mr. Swainson is as much entitled, in fact more so, to consider the common wild Turkey of North America as his rasorial type of that group; it presenting a greater analogy to the Vultures than the *Alectura*, Latham, which in its habits and manners is a true gallinaceous bird.

But although the Vultures considered as a family present a very

extensive distribution, yet in their subdivisions they are more restricted; for we find the Vultures, properly so called, entirely in the Old world, their place being supplied in the New by the species of the genus *Sarcoramphus*. Nor do the different divisions of the Vultures stand thus alone in representing each other in the different continents, it being a law extending through many groups of the ornithological system. Thus the *Platyrhynchi* of the New world are represented in Asia by the *Eurylaimedæ*. The *Pardalotidæ* of Australia are represented in Asia by the *Calyptominedæ*, and in the New world by the *Piprinæ*. The *Buccomidæ* of Asia are represented in Africa by the *Pogonidæ*, and in the new world by the *Tamatiadæ*. The *Rhamphastidæ* of South America are represented in Asia and Africa by the *Buceridæ*, and in Australia by the *Scythropidæ*. The *Oriolidæ* of the Old world are represented by the *Quiscalidæ* in the New, which group, with one exception, as in the *Piprinæ*, is confined to America. The *Melleagridæ* of America are represented in Africa by the *Namidæ*, in Asia by the *Phananidæ*, and in Australia by the *Alecturidæ*. And, lastly, the *Struthionidæ* of Africa are represented in America by the *Rheadæ*, in Australia by the *Casuaridæ*, and in Europe and Asia by the *Otidæ*. Numerous other examples could be given, but there are still a great many genera which form as it were isolated examples to individual continents, and for which we cannot find any representations. Thus we have no tribe in New Holland to represent the *Picianæ*; no tribe in Europe to represent the *Psittacidæ*; no tribe in Asia, Australia, or America to represent the *Scopidæ* of Africa; and, in fine, no tribe in any of the other continents to represent the *Musophagidæ* or *Gypogeranidæ* of Africa. Whether there ever existed in the different continents groups representing each other to a greater extent than we have at present, will probably remain a mystery, even although organic remains should be found; birds not presenting in their osteology, at least in many cases, sufficiently marked characters. Comprehended in the genus Vulture, properly so called, we have eleven species; of those, three are found in Europe, but none proper to it, being also found in Asia and Africa; in Asia six, three of which are properly, one of them being also found in the Indian islands; in Africa eight, five of which are proper; supplying their place, as already stated, we have in the New world *Sarcoramphi*, of which there are four species common to North and South America, if the opinion of Nuttal is correct in regard to the occurrence of the Condor in the North American continent. It is probable however that it may have been confounded with the *Sarcoramphus Californianus*, a nearly allied species. The *Sarcoramphus papa* seldom goes as far north as the United States; Bonaparte states that it is occasionally met with in Florida, which is pro-

bably its northern limit. It is described by D'Azara as common in Paraguay, but he states it does not pass the 32° of south latitude*; in the intermediate countries it appears to be very abundant. The genus *Cathartes*, consisting of two species, is also confined to North and South America, its place being supplied in the Eastern hemisphere by the genus *Neophron*, represented by the *Neophron perenopterus*, a species common to Europe, Asia and Africa.

Adding together the species belonging to the different divisions of Vultures, we have thus only eighteen known; a small proportion when compared either to the Falcons or Owls, but the numbers in which they occur fully compensate for this. The warmer regions of Africa and Asia must be considered as the metropolis of the Vultures, properly so called.

We now enter upon the second division of the *Falconidæ*, which has been divided by the Baron Cuvier into two grand divisions, viz. the noble and ignoble Birds of Prey; the former comprehending the Falcons, properly so called, the latter the Eagles, *Hierofalco*.

The *Falconidæ* considered as one group, possess very extensive distribution, belonging to our *Katholiko-dianamial* division, occurring from the 80° of north latitude to the equator, and from the equator to the 55° of south latitude, and in all the intermediate spaces; yet when taken generically, many of them, as in the *Vulturidæ*, have a rather restricted distribution.

Of the genus *Falco*, properly so called, we have representatives in all the different continents, but in Europe we meet with the greatest number of typical species; not one of which, however, is confined to it. Thus of the forty-four species contained in the genera *Falco*, *Hierofalco*, *Hierax*, *Harpagus*, *Lophotes*, and *Erythropus*, nine are found in Europe, of which two are proper to it, belonging, one to the genus * * * the other to the genus *Erythropus*; in Asia twelve, five of which are proper, three of these found also in the Indian islands; in Africa eighteen, eleven of which are proper; in Australia five, and four proper; in North America five, and one proper; and in South America twelve, and of these ten proper. Of the other seven species found in Europe, but not proper to it, three are common to Europe and Asia, one common to Europe, Asia, and North America, one common to Europe and North America, one common to Europe and Africa, and one common to Europe, Australia(?), North and South America.

It may be laid down as a well ascertained fact, that birds of temperate, and many birds of arctic, countries—that is, those birds which are known to breed there—possess a much wider distribution than those

* Word illegible in M.S.—Eds.

of tropical countries; for in very few instances do we find birds of tropical countries extending their migrations to temperate countries,—a statement which is applicable to more than a third of the birds of Europe. But although we find these European birds inhabiting regions within the tropics, yet we in general find them in those places whose mean annual temperature is little above that of Europe, caused either by the position or form of the country. To this rule however we have several exceptions, as in the *Sturnus vulgaris*, *Pastor roseus*, *Oriolus galbula*, which inhabit both tropical and temperate regions, although probably more abundant, at least the last two mentioned, in the former. It may also be noticed as a curious fact, the reason for which is yet unexplained, viz. that the European species which are found in tropical countries are in general smaller, although identical in every other character with the same bird found in Europe; in other cases we find them not only smaller, but at the same time undergoing slight modifications, which, however, are permanent, and therefore entitling us to consider them as new species and the representatives, in the particular regions in which they are found, of the European. Such is the case with regard to the Nut-hatch, Blackbird, Goldfinch, Siskin, Nut-cracker, Field-fare, Music Thrush, &c. all of which are found in India.

(To be continued.)

ART. VIII.—*On the use of Wells, &c. in foundations; as practised by the natives of the northern Doab. By Captain* CAUTLEY, *Superintendent of the Doab Canal.*

Piles and caissons being the usual means adopted for foundations in Europe, where the soil and substrata are insufficient, I will venture a few remarks on the system adopted in northern India* for the same purpose, especially in the application of hollow cylinders, or wells of masonry. The plan of undersinking wells does not appear to be totally unknown, although it is not practised in England; in fact the only approach to the method upon which I am now about to occupy the pages of this Journal, is exhibited in the works at the Thames Tunnel, at the descent to which Brunel has sunk masonry cylinders "fifty feet in diameter, strongly clamped with iron, &c." the process of effecting which I have no means of describing. Our Upper Indian system, however, is so admirably adapted to the purposes for which it is intended, and so much superior to pileing (caissons I put out of the ques-

* The undersinking of wells, and their use in foundations, is not confined to the northern Doab; it is practised in Bengal and other parts of India.

tion) that a few remarks, drawn from practical observation, may perhaps induce others, with more information than myself, to attract the notice of English Civil Engineers to a resource well worthy of their attention. The Hindoo religion in deifying the great rivers, and inculcating on its disciples the necessity of constant ablutions, and the rewards held out to those who multiply the shrines and temples on the banks of the sacred waters, have been the cause, in all probability, of the adoption of this system of foundation. In an alluvium so extensive, and so moveable, piles, were they used, would have been found inefficient; the native engineer, however, has no machinery with which piles of a sufficient length could be driven; timber, moreover, at those places where the greatest demand would have existed, could not have been procured without great difficulty, and very great expense. The means of making bricks, on the contrary, were at hand; the labourers required to build masonry and to sink wells were to be found in the neighbourhood; the solidity of structure was withal more pleasing both to the projectors and to the builders; and the idea once adopted, the use of wells not only on the edges of the river, but in all places where the badness of the soil and the height of spring water rendered excavation impracticable, has been acknowledged as the standing resource in the system of hydraulic architecture of Upper India. At Muttra, Bindrabund, &c. where flights of steps or ghâts sweep the whole line of the Ganges within the limits of the respective towns, wells have been extensively used in foundations. The Mussulman buildings at Agra are largely indebted to wells, where the proximity of the Jumna made a depth of foundation necessary; the Doab Canal works have paid equal homage to this admirable native conception, and it is from these works that I shall collect data to enable the reader not only to comprehend the method which is put into practice when wells are used, but also to draw a comparison between their value as the means of foundation, and that of piles and other methods in use elsewhere.

The Chah-kun (from چاہ a *well*, and کن the affix from کندن *to dig*,) or well-sinker is a distinct trade scattered throughout the villages of Upper India. Its followers are called into requisition either for sinking new, or for clearing out old wells; in the former case, generally doing their work by contract, at a fixed rate per *hâth* or eighteen inches of depth of sinking, and in the latter by the job, or so much for clearing out the well and rendering it fit for use. The expertness of this class of people depends very much, of course, upon practice, and the depth of wells to which the Chah-kun has been accustomed. In a country where the undersinking does not exceed

ten or twenty feet, the well-sinkers will profess their inability, or decline to contract for greater depths; in fact where cylinders are required of from thirty to fifty feet, the Chah-kuns above mentioned would decline the undertaking altogether; the tools and method of using them in such a case, being quite different from what they have been accustomed to.

The tools in use by the Chah-kun consist of the *Phaora*, or common *Mamooti*,* as it is termed in the Ordnance Magazines, and the *Jham*, a large species of *Phaora*. The size of the *Jham* appears to vary according to the fancy of the well-sinker: in the cases which have come under my own observation, the blade has been usually twenty-seven inches wide by thirty-six inches long. The handle, which is short, but similar to that of the *Phaora*, is tied to the blade by a rod of strong iron wire, providing a support and means of attachment for the rope by which the machine is put into operation. The apparatus is a rough looking and barbarous affair, but well adapted to the use to which it is applied, and to the people by whom it is approved of.

In village well-sinking for the use of irrigation, or to supply the inhabitants with water for drinking and other purposes, where the supersoil is tenacious, and resting upon loose strata, in which the springs are found, it is usual to excavate through the upper soil down until water is reached; a ring of timber adapted to the thickness of the walls of the cylinder is then placed horizontally, upon which the masonry is built to a height of three or four feet above the surface level of the country; as the masonry advances, the outer surface is rubbed over with mortar, and the whole is allowed to obtain a moderate degree of induration by remaining untouched for at least ten days; at this period the Chah-kun, or well-sinker's aid is put in requisition. In the earlier stage of the proceedings, the Chah-kun carries on his work very easily, it is only when the cylinder has reached to a depth beyond that of himself, that the tedious and difficult part of his labours commence. After descending the well, and having in the first instance fixed a string and plummet to the top so as to secure a regularity in the depression, he commences by removing the soil from the centre, and then from the four sides respectively; the soil is brought up to the surface in baskets, and the Chah-kun at the top is in sole charge of the plummet and its movements. For the first three or four feet of sinking there is little fear of accident, and little trouble; in fact, up to this point I have frequently employed common labourers, who, with a little care and superintendence, have done the

* Query.—Whence this word?

work as efficiently as an experienced well-sinker. On the application of the *Jham* (vide supra) the top of the cylinder is loaded with logs of wood and heavy articles that may be at hand; a fork-like prop with a pulley is fixed in the ground, so that the rope which runs over the latter, and to which the *Jham* is fixed, should run centrically over the well; the Chah-kun then descends with the *Jham*, and with his hands and feet (for the natives use both with equal facility,) forces the instrument into the soil until it gets properly loaded, when it is drawn up, the contents removed, and the same operation is continued until the work is completed. After the soil has been removed beyond five or six feet below the surface of the water, the Chah-kun's duty is constant *diving*.* I have known them to remain half a minute and nearly a minute under water without any respiration. Each man is relieved at the end of the hour, and in hot weather the cold that they suffer in their escape from the well is severe to a degree; large fires are kept burning for them to recover themselves at, and a liberality on this point is one of the chief agreements between the well-sinker and his employer. In the cold season the annoyance from change of temperature is infinitely less, and the people themselves have often assured me that they could in this weather do twice the quantity of work, and with one-half of the labour to themselves, that they could do when the weather is hot, and when the evaporation was so rapid.

In describing the process required for the sinking of one well for common village purposes, we have only now to shew how the application of a number of these wells in conjunction can be turned to account for the purposes of securing a good foundation; for this purpose I shall give plans and sections of some of the works on the Doab Canal, explaining the method adopted in these works, and also shew how, under different circumstances, the same plan of foundation has been used with equal effect.

The course of operations depends on whether the wells used in foundation are placed close together, or at a distance. For piers of bridges with extensive waterway and heavy superstructure the former is usually adopted; in other cases, the wells are placed four feet apart, and connected together by masonry arches, upon which the wall, pier, or building is constructed.

In Canal works, however, it is often an object to obtain a running line of wall for foundation unbroken by divisions or points of separation, through which the substrata, when consisting of a loose sandy soil,

* In very deep wells, where the *neemchuck* exceeds twenty-five feet from the water's surface, the *Jham* is worked by long poles fixed to the handle, and the work is most tedious.

might escape, especially where there is a head water with springs opposed to it. In locks or descents, for instance, constructed in sand, where the subsoil in addition to its own natural spring water has that of the Canal to act upon the flooring of the lower chambers, there is a considerable tendency to the removal of the sand under these lower floorings, which seriously affects the stability of a work, and is only to be provided against by enclosing all the subsoil in continuous lines of foundation. I shall hereafter describe a remedy invented by Col. John Colvin, C. B. of the Engineers, formerly Superintendent of the Delhi, and Superintendent General of, Canals; but in the meantime it is evident that where wells or cylinders are used, the continuity of a wall is imperfect under any circumstances; for place them as close together as possible, there is still a separation—the curtain so much desired is wanting. The methods adopted by me in the two cases, first, where wells are sunk *close together*, or leaving a space of six or eight inches, which is the least that can be safely given, and, secondly, when at a greater distance apart, are these—piles, and as the English engineers now term it, *concrete* (an article which, I may observe in passing, has been in use in Hindoostan from time immemorial); the former in the works on the Doab Canal varying from sixteen to five and a half feet in length, and the latter laid in as deeply as possible between the piles, and allowed to stand for some days to settle and indurate. The piles are made of young Saul trees (*Shorea robusta*) cut in the forests in the northern slope of the Sewalik hills, in the Deyra Dhoon; or when only five and a half feet long, of the species of rafter called by the natives *Kurri*, the smaller sort averaging from ten to twelve feet long and three and a half inches square, sawed out of Saul timber in the forest, and imported in immense abundance into the plains swung on the back of bullocks by the Brinjarris, or class of people who lead a roving life, employing their cattle in this species of work. The concrete consists of *kunker*, an alluvial lime rock peculiar to India—of stone boulders from the river broken into fragments—the *gutta* or refuse of lime kilns, mixed with a proportion of cement, consisting of two or three parts of *soorkhee*, or pounded brick, and one part of the best stone lime thrown in and well mixed together with a pole, sharp at one end and blunt at the other; the former to stir up the mixture for a certain time, and the latter to ram it down until it is properly placed in position.

The figures in plates 1 and 2 represent these methods in detail, with the *neemchuck* and tools used by the well-sinkers; and in plate 4, which is a plan and section of falls and locks as constructed on the Doab Canal, the application of both will be easily recognized.

The depth to which a cylinder of six feet in the diameter can be sunk during the day by one party of well-sinkers through a sandy stratum as far as ten feet, varies from two and a half feet to four inches. It is desirable when the well has to be sunk to this depth only, to expedite the depression of the three or four last feet as much as possible, so as to get the cylinder to its full depth, without leaving it during the night, and allowing the loose soil to settle round it, and give it a firm embrace. It is very difficult at times to free the sides of the cylinder from the hold which the sand has in this case upon them, but even with a very heavy weight applied to the top half a day may be expended in this way, without getting the well to move at all—a remark equally applicable in pile-driving through sand, where the advantages of driving the last pile that is driven during the day to its full depth, is well known. I have seen a pile, length twenty feet and diameter eight inches, which has been driven ten feet on the previous evening, resist on the next morning the weight of the pile engine for forty successive strokes—the weight of 250 lbs. falling through a space of ten feet, the head of the pile becoming perfectly shattered and useless. The following table will give an approximation to the expense of sinking cylinders of the above mentioned diameter to a depth of ten feet, and although the difficulties attending the operations from which this table was formed were greater than would be generally experienced, a very tolerable idea of the expense of well-sinking will be exhibited.

Soil, sandy, mixed with clay, but free from stones or kunkur; full of springs, with the canal head water ten feet above the point at which the cylinder commenced sinking; outer diameter of well six feet, and in some instances eight feet, and inner diameter four and six feet respectively; machinery employed night and day in keeping the water down to the level on which the wells were built; windlass used with the *Jham;* period of operation between January and May.

Well Sinkers.	Windlass men.	Labourers.	Carpenters.	Smiths.	Sundries, Rope, Iron, Leather, Oil &c. &c.			Expense in labour.			Total expense.			Length of well or cylinder sunk in running feet.
					RS.	A.	P.	RS.	A.	P.	RS.	A.	P.	
1267	1688	358	30	30	10	10	2	439	5	10	450	0	0	202½

Or average per running foot Rs. 2:0:4

The cost of building a cylinder of the above diameter, viz. 6 feet and 10 feet high, may be thus—

Labourers, ...	9	0	0
2050 bricks, 12 × 6 × 2 ..	10	4	0
16 maunds stone lime, ..	6	0	0
Neemchuk or curb, ...	2	12	0
Total cost, ..	28	0	0, or per foot 2 : 12 : 10

giving the average cost of well-sinking, using a cylinder of six feet in diameter and carried to a depth of ten feet at Rs. 4 : 13 : 2 per running foot. In the above table, however, as I before remarked, the items are dependent on difficulties which in well-sinking from a plain surface—from the level of a garden for instance—would not be met with. In wells situated in this way, and of similar dimensions in every respect to those upon which our data are formed, the expense varies at from three rupees six annas to four rupees per running foot, the difference depending on the cost of labourers—the price of materials remaining constant. The masonry of well-building I have generally found to vary from eighteen to twenty rupees per 100 cubic feet.

In wells of from sixteen to twenty feet depth the expense per running foot has been found to vary from Rs. 7-8 to Rs. 8-8, using the cylinder above noted; to a greater depth, however, they require to be of larger dimensions; but it would be interesting to discover the progressive advance in expense on each ten feet of well-sinking; it would possibly advance in a series with a common multiplier of two, leading to the following table as an approximation—the upper line representing depths of cylinder in feet up to fifty, the second the cost per running foot, and the lower the actual cost of well at each depth as noted in the upper line.

10 ft.	20 ft.	30 ft.	40 ft.	50 ft.
4 Rs.	8 Rs.	16 Rs.	....	....
40 Rs.	160 Rs.	480 Rs.	....	....

The two first columns are formed on my own practical observation, and the third is from the cost of village wells, extracted from the statistical notes of the Revenue Surveyors in the upper portion of the Doab, *plus* the expense of undersinking the first sixteen or twenty feet, which in village wells is generally built up. Whether the progression which holds in these may be extended further, as I have proposed in the fourth and fifth columns, may be easily shewn by reference to the Engineer officers who built the bridges on the East Kallee Nuddee, and Hindun rivers; (to Captain Debude, and Lieutenant Alcock,

* The M.S. is blank in these spaces.—Eds.

these notes are especially addressed); the piers of the Hindun bridge resting on wells up to the limit of the table above proposed.

It must be recollected that the cylinders are supposed to be undersunk from the commencement through a sandy soil, and with spring water at the surface—as must usually occur in foundations where the application of them for that purpose would be necessary. The cost of village wells, which although thirty or forty feet deep are only undersunk on reaching the springs, is proportionably less.

With reference to the value of obtaining a connected curtain, or line of running wall in foundation, where the interference of spring water renders undersinking necessary, Colonel Colvin, C. B. of the Bengal Engineers, proposed a plan of sinking square masses or parallelopipedons of masonry, piercing these masses by wells, as represented in Fig. 1. Pl. 3. The plan succeeded in every respect. In those of from ten to fifteen feet long and four feet wide, undersinking to a depth of ten feet in sand mixed with small shingle was carried into execution with perfect success in the foundations of the dam over the Somhe river. Water was, at the point where the dam had to be constructed, immediately on the surface; the object of the dam was to retain the supply of water to a considerable height to throw it into the Delhi Canal, and maintain a supply during the dry months. Circular wells were objectionable for the reasons which I have before explained, and it was a desideratum to get such a foundation, that the head pressure of water should affect the leakage *under* the dam as little as possible. Fig. 1. Pl. 3. will explain the method adopted, the spaces between the boxes on the first row being covered by those in the second line.

The method put into practice in sinking these masses is similar to that in cylinders, but greater care is required in regulating the operation of the well-sinkers, so that the mass may be lowered equally. The curb, or *neemchuk*, is a platform of wood equal in size to the base of the masonry, with round or oval holes cut for the wells, as shewn in Fig. 1. Pl. 3. I have used these masses in lengths of twenty-one, feet, by four feet wide, to a depth of ten feet, with perfect success, giving three wells in each. I should however limit the dimensions to fifteen feet by four feet, with two wells elliptical, five feet by two and a half each, which with proper care will be sunk to a depth of ten feet through sand without any difficulty. There appears no reason why a whole foundation of a work within certain limits might not be sunk in this way. It is often a difficult matter to obtain foundation for a bridge with an arch of twenty feet span where the soil is sand although the drainage is not liable to freshes or any violence of current. A bridge of this sort, with a roadway of fifteen feet, would

require a mass in superficial area equal to twenty-eight feet by eighteen, to a depth say of from six to ten feet, which would be quite sufficient, even if the mass rested on sand. There is no reason why, by piercing this block with cylinders, the whole might not be lowered, and a foundation obtained of infinitely greater security, and certainly not at greater expense, than any of the methods now adopted. The great advantage however of this plan over others, is its simplicity; all the apparatus, machinery, &c. of pileing are thrown aside; a few carpenters procurable at every village, and masons to be had without difficulty, with some Chah-kuns to sink the mass, are all that is required.

Where stone in slabs is to be procured, a method is adopted by the natives of forming what they call *kothis*, that is to say a caisson without a bottom. The stones are clamped together, as shewn in Fig. 3. Pl. 3, by wooden clamps; these boxes are undersunk in the same way as the cylinder, but the form is inconvenient, and the difficulty of sinking them greater than either the cylinder or the block above described. The circular form as regards friction alone, offers a much smaller surface than the square; but the square block of Colonel Colvin has great weight to assist its descent, which the stone *kothi* has not. In the foundations of the bridge over the Caramnassa river, laid down by Nana Farnavis, these *kothis* were extensively used. These foundations when laid bare for the ulterior operations appear to have extended across the bed of the river on a width of sixty feet, the *kothis*, which were fifteen feet square, being placed close together, and sunk through sand to a depth of twenty feet. The reader is however referred to Vol. 3. of the Gleanings in Science, in which Mr. James Prinsep has given a most interesting detail of the Caramnassa bridge operations. I may however remark that the *kothis* in question after being sunk are filled with *grouting*, or a mixture of lime, kunkur, &c. (concrete) forming an artificial conglomerate, upon which the superstructure is raised. Mr. Prinsep uses the word *dhoka*, in this part of India *ghutta* is the term usually applied to this species of material. The *jamvat* corresponds with the *neemchuk* of the northern Doab.

Another species of *kothi*, which is also used not only in foundations but in village wells, consists of frames of wood joined together at the angles, as represented in Fig. 4. Pl. 3; this from the want of weight is still more difficult to sink than the one before described; it is however convenient where wood is plentiful, and the soil to be pierced of a light description; they are undersunk precisely in the same way as the common cylinder. In village wells, when the *kothi* is from four to five feet square and the thickness or scantling of the wood used four or five

inches, it lasts for many years, and merely requires repair in the upper portion, where its exposure to the atmosphere tends to the destruction of the material.

The *Sundook*, or box, is another, and perhaps the most awkward of all methods to obtain a depth of foundation; it is adopted by the natives, but generally where there are no experienced workmen. The plan and form of this box is represented in Fig. 5. Pl. 3; the size generally about ten feet long by five feet wide, and depth not exceeding five feet. The size of the box being lined out on the ground where it has to be sunk, a pointed timber six feet long, or thereabout, and four inches square, is driven into the ground at each corner, two inch planks are then nailed on the uprights, and the whole made as strong as possible, either by additional uprights on the sides or by transoms; the soil is then removed from the inside, and the depression goes on by driving the uprights down with mallets, as fast as the removal of the soil from the inside will admit of it. As may be supposed the frame work is liable to disarrangement in every way; when sunk to its full depth the interior is filled with *grouting* (concrete) and the heads of the corner piles or uprights sawed off. These foundations are allowed to stand for a year at least before the superstructure is commenced.

Pileing as the means of foundation, appears, as far as my observation has gone, to be totally unknown throughout Hindusthan. I have never met with it under any form, or under any modification. The fact is, that labour is so cheap in India, that it is less expensive to adopt any means for purposes of this sort with *manual* labor, than with *machinery!* That the value of the latter would in the course of time be most justly appreciated, there can be no doubt; but the philanthropy of the existing generation has not arrived at that point which would lead the builder of a Ghat or of a Musjid to *experimentalize*, when he has before him a secure, and well authenticated method of operation.

To recur to the wells or cylinders, it is usual to fill them with *grouting* of lime, kunkur, and broken brick, so as to make a solid mass of the whole for the superstructure to rest upon. This may be necessary where the wells are sunk to a great depth, and where the superstructure is of great weight, but in other cases the value or necessity of such an arrangement may be doubtful. The wells used by me have never exceeded twenty feet in depth, the greatest number only ten. From their position they are in some instances liable to be undermined by a current setting in upon them when supporting a revetment or line of ghat, or in the case of locks from under-currents, and I have inva-

riably filled the cylinder with large masses of kunkur, or vitrified brick, *without* cement of any description, on the principle, that if the stratum upon which the cylinder rested was at all acted upon or undermined, the masses of loose material would sink and occupy the space caused by the action of the water below; in fact the hollow cylinders are quite sufficient to support the superstructure placed upon them, the internal space may therefore be well occupied by any means to counteract danger from the vagaries of the stream.

The varieties of lime procurable between the Himalayas and Delhi are peculiarly favourable to hydraulic works. The beds of the rivers which drain the valley of Deyra, situated between the parent mountains and the Siwaliks, are loaded with boulders of lime rock; the shingle strata of the Siwaliks themselves contain also a plentiful supply; these, with the main outlets of the Jumna and Ganges provide lime for all the upper portion of this Doab. The boulders are collected and either burnt on the spot, or carried to the works; in the former instance the cost of the material from the Hills to points between them and the town of Saharunpoor averages as follows:—

	Rs.	
Cost ₹ 100 maunds at the Kiln from 8 to 10 Rs. say,	10	0
Carriage of ditto to the works at ₹ mds. 3 to 3½ As. say,	21	14
Custom levied at the Ghats or passes in the Siwaliks, say, ½ an anna ₹ bullock load	2	2
Total cost ₹ 100 mds.	34	0

Although this lime is in many cases pure, i. e. crystalline carbonate without admixture—and by selecting the boulders previously to burning may be obtained sufficiently pure for the whitest stucco, or white-wash—the article from the kilns is much adulterated with clays and metallic oxydes, arising from the varieties of lime rock which are thrown into the beds of the rivers. With the use of soorkhee therefore (or pounded brick) this lime makes an admirable water-cement. In wells and foundations I have generally used it in the following proportions:—

2 parts Soorkhee
1 ditto Lime, or
5 maunds, or 400 lbs. of Soorkhee
1¾ maunds, or 140 lbs. of Stone Lime

mixed well together in a mortar mill before it is used. Above the level of the water I have found it advisable to reduce the quantity of soorkhee; the cement in this case consists of

1½ parts of Soorkhee, or 3¾ maunds
1 ditto of Lime, or 1¾ maunds.

The lime in fact is so good, that where well burnt bricks are used, bad masonry is entirely out of the question; the builder cannot help himself, and for this portion of his duty deserves no sort of credit whatever.

This stone lime is used universally on the Doab Canal from the point where it leaves the Jumna to Rampoor, a town twelve miles south of Saharunpoor; from this the marles and kunkur limes of the districts come into use, although the stone lime is brought into requisition on a smaller scale for arch-work as well as parapets; and in plaistering masonry works it is solely used.

The marle, or earth lime as it is usually called, is in much greater abundance on this line than kunkur. When extracted from the quarries or pits, it is perfectly soft and friable, in which state it is kneaded up into round balls about two or three inches in diameter, which are placed in the sun to dry, previously to their being burnt in the kiln. The marles differ very much in quality, but all of them make an admirable water cement. That from Jussool, a village on the Khadir of the Hindun river is the most approved of, and is delivered on the works within a circle of ten and fifteen miles at about twelve Rupees per 100 maunds. These marles are full of fresh water shells of species now existing in all the tanks, jheels, and rivers of the country; those of *Melania*, *Lymnæa*, and *Planorbis* being in the greatest abundance.

The kunkur limes are more numerous in the southern districts of the Canal, they also make a good water cement, but contain no remains of fresh water exuviæ.

Near a village called Hursoroo, twenty-five miles to the south-west of Delhi, a very superior kunkur lime is procured—the formation itself is intermediate between kunkur and marle, but the position of the quarries from which it is excavated is similar to that in which all this material is procured, in a low tract of country, the site in all probability of a lake or jheel now filled up.* The same fresh water shells as are found in the marles to the eastward of the Jumna, are very numerous in the Hursoroo lime. It is exported in large blocks, and is sold in Delhi at from twelve to fifteen Rupees per 100 maunds. The cost after burning varies from twenty five to thirty Rupees per 100. This lime for a water cement is very far superior to any lime that I have met with. When calcined it is of a very light color, and

* Hursoroo is situated on a nullah which rises in the small hills near the Kotub Miner, and flows into the southwest end of the Furnukauggur jheel. The town of Hursoroo, or as it is more commonly called Hursoroo ghurree, is about two miles from the jheel.

might be mistaken for the stone lime of the Northern Division. In the locks and works on the Doab Canal, appended to them at Shukulpoor, Sikrani, and Jaoli, in the southern district opposite Delhi, nothing but Hursoroo in the following proportions has been used in the superstructure,

1 part of Hursoroo,*
1½ ditto of Bujree,

and in the neighbourhood of Delhi the use of pounded brick, or soorkhee, has been almost entirely superseded by that of Bujree.†

The sand stone, which is an attendant upon the great Quartzoze formation of the ridge upon which Tughlukabad, the Kotub Minar, and old and new Delhi stand, varies from compact and crystalline, to a loose and friable rock; in this latter case it consists of an agglutination of minute angular fragments of quartz, with, in some cases, a red oxyde of iron in such abundance as to give the strata quite a peculiar character; in other cases the oxyde is wanting, and this friable rock is of a light color. For roads and other purposes these varieties of the sand stone are much in request, and amongst the natives obtain the name of *Bujree*. Nothing could be a better substitute for soorkhee, than the substance in question. The presence of the iron oxyde is in every way favorable to its value in hydraulic works, and the sharpness of the particle of which it is composed renders it an admirable mixture with lime for plaister or stucco. In this form it stands the effect of the climate much better than soorkhee or river sand. In the proportion of one part of Hursoroo lime to one part of bujree, mortar laid on with a float, as is used in sand, may be considered very far superior to it, and with a much better appearance than that practised by the natives, under the tedious process of beating with the *thappa*. This bujree is now universally used on the Doab Canal works, at all points at which it can be delivered under eight rupees per 100 maunds, this being the maximum rate of

* The following is the detail of proportions used in the cement at these works, and as they were built in 1834-35, a sufficient time has elapsed to judge of the durability of the masonry, no repair of any description having taken place up to this period.

Foundations including Floorings, &c.	Hursoroo Lime,	1	part.
	Earth Lime,	2	,,
	Bujree,	2	,,
Superstructure, ...	Hursoroo Lime,	1	,,
	Bujree,	1½	,,
Plaister, ...	Hursoroo Lime,	1	,,
	Bujree,	1	,,
Sundulla or outer thin coating given to the plaister, as a finish.	Stone Lime,	8	,,
	Soorkhee,	1	,,

† This has I believe been the case in the Delhi works for many years.

pounded brick. For water cement the Hursoroo lime with a proper proportion of this red bujree may perhaps be considered as superior to all others attainable in this part of the world.

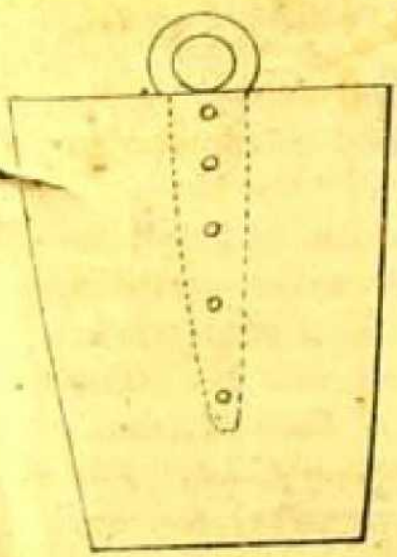
In conclusion:—the Saul (*Shorea robusta*) which is found in great quantities in the Deyra Dhoon, and especially on the northern slope of the Sewaliks, is the wood chiefly used on the Canal works for piles, rafters, lock gates, sleepers, windlasses, vanes, &c. &c. The Sissoo (*Dalbergia sissoo*), Toon (*Cedrela toona*), Sirr (*Acacia serissa*), are used in doors, door frames, mill machinery, &c. For handles of tools, pickaxes, phaoras, arbors of mill wheels, &c. the *Acacia catechu* (or *Kyr*) the wood from which the *Terra japonica* of commerce is procured, and which grows in great abundance in the forests south of the Sewaliks, and the *Acacia arabica* (or *Keekur*) are chiefly in request. For Neemchuks of wells the natives always select the Dhák or Plass (*Butea frondosa*), and if this is not to be had prefer the wood of the *Ficus Indica, F Bengalensis, Bombax Malabaricus* (*Semmul*, or cotton tree); the Horse radish tree (the *Hyperanthera morunga* of botanists) is also used:—in fact, all the light woods which are valued as floats for rafting timbers are considered better than others for the curbs of wells. The Neem (*Melia azadirachta*) is a useful wood for small rafters, door frames, &c. from being less liable to the attack of white ants. A variety of Pine (*Pinus longifolia*) which grows in extensive forests in the Sewalik mountains is held in no esteem by the natives; it is good for making light boxes and common furniture, but in attempting to bring it into use on the works I have failed; very capital tar,* however, is procured from it, as well as turpentine.

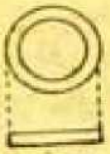
To Mr. acting Sub-Conductor John Pigott, Overseer of the northern division of the Canal, under whose charge the greater part of the works from which the above data on well-foundations have been formed, I am indebted for much valuable aid; his introduction of the windlass in sinking wells has not only led to a great saving of expense, but added much to the facility of depressing them. His general quickness, moreover, at resources under sudden and unexpected difficulties, which can only be appreciated by those who have seen the effects of the *Roas*, or mountain torrents in the rainy months, is deserving of the best acknowledgment that I can offer him.

Northern Doab, May 8th, 1839.

* Vide vol. 2 page 249, of the Journal. The Editor here uses the word *turpentine* for *tar*. The manufacture of tar, and *not* turpentine is described; the error was not corrected at the time.—*Author's note.*

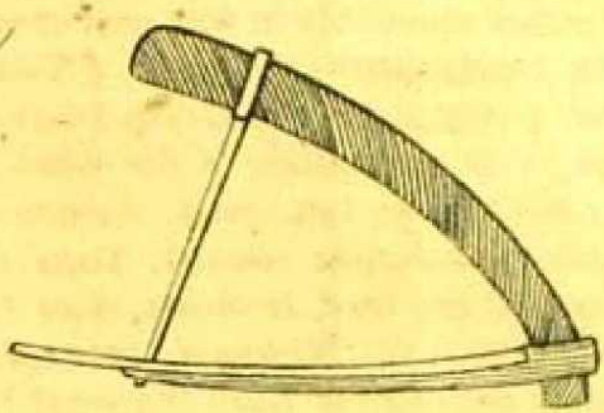
Tham used in W Sinking





ring. a

Fig 1



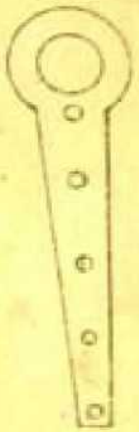
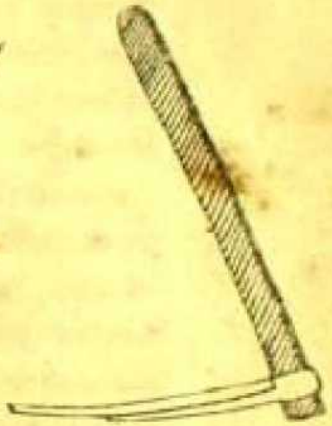
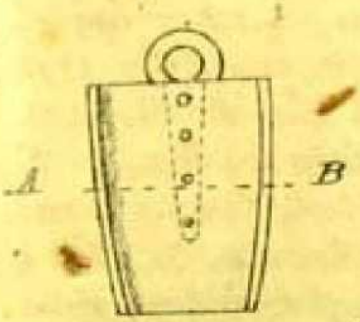
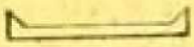


Fig 2. Phaora used in Well Sinking



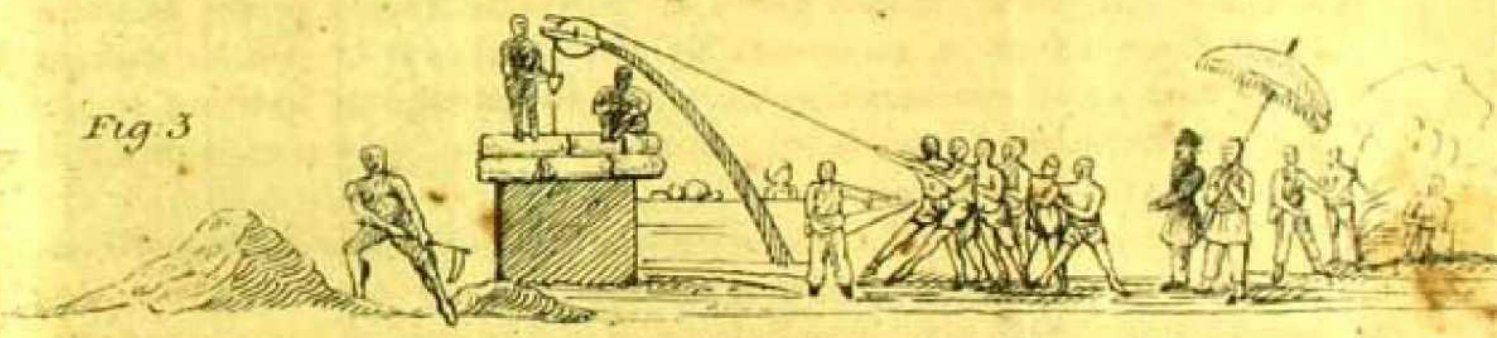


Section on A B



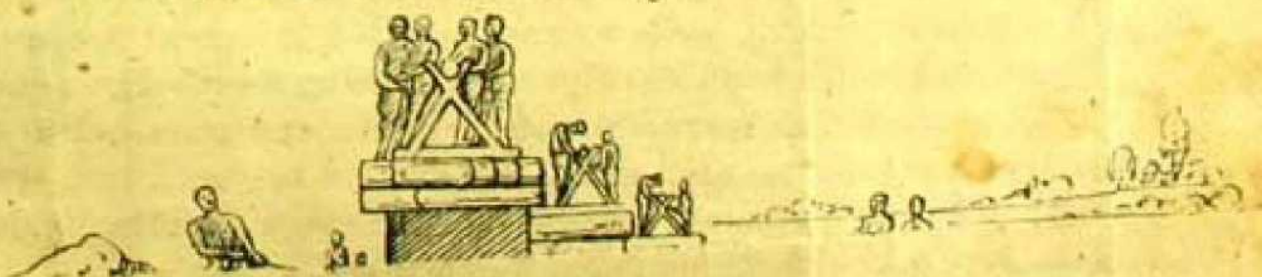
Native method of working the Tham/

Fig 3



Canal method of working the Tham/

Fig 4



Art. IX.—*Proceedings of the Asiatic Society.*

(*Wednesday Evening, 3rd April*, 1839.)

At a Meeting held at the Grand Jury Room of the Supreme Court.

The Honorable Sir E. Ryan, President, in the chair.

The Proceedings of the last Meeting were read.

Read a letter from the Secretary of the American Philosophical Society, acknowledging the receipt of numbers of the Journal of the Asiatic Society.

Read a letter from Professor Lassen to the address of Mr. James Prinsep.

(The substance of this letter has been published in the New Series of the Journal for February last.)

Read a letter from M. Burnouf, Secretary to the Asiatic Society of Paris, acknowledging the receipt of the "*Mahabharata*," vol. 3rd, transmitted for sale in France.

Library.

Read a letter from J. P. Grant, Esq. Secretary to the Government of India, Revenue Department, forwarding for inspection of the Society a copy of the 6th No. of Dr. R. Wight's Icones Plantarum.

Illustrations of Ornithology, Nos. 3 and 4,—*purchased by the Society.*

History of British Birds, by W. Yarrell, part 9th—*purchased by the Society.*

Literary and Antiquities.

Read a letter from H. T. Prinsep, Esq. Secretary to the Government of India, Political Department, forwarding for deposit in the Society's Museum, coins and reliques of M. Masson's collection, being duplicates selected by Mr. Cracroft at the time he took charge of the original collection.

Read the subjoined letter from Mons. De Paravey, Royal Engineers (French), to the President. Mons. D. Paravey urges the publication, at the expense of the government or of some public institution, of the valuable Chinese work (M. S.) on Geography and History in 70 vols. now in the Royal Library of Paris.

"*A Monsieur Le Président de la Société Royale de Calcutta.*

"Monsieur le President.—J'ai l' honneur de vous addresser, pour être déposer sur le Bureau de votre Honorable Société trois opuscules, publies dans le but de faire ordonner pour quelque académie ou quelque gouvernment eclairé la traduction, possible en Europe en ce moment des principaux livres Chinois relatif à l'histoire et a la géographie. Par une fatale disposition aux futilités depuis M. Deguegner on n'a traduié du Chinois, que des Romans et des pieces de Théâtre, et on ne-nous a donné aussi que des Pieces de Theatre fort ennuyeuses, en tout au plus bornées a nous faire connoitre quelques détails de mœurs. Il y a, en Chine, d'autre trésors à puiser; et il appartiendroit à votre Honorable Société d'obtenir de la Société ou de la compagnie des Indes, l' Impression, a ses frais, de la traduction, possible à Paris, en ce moment da Pian-y-tien, immense ouvrage relatif à la géographie des pays qui entourent la Chine, tels quel' Indo-Chine, la petite et la grande Boukharie, la Corée, le Japon, et meme l' Amerique qui y est decrite sur le nom de 扶 fou' 桑 sang ou de pays de l'orient extreme. J'ai montre ce bel ouvrage en 70 volumes (envoyé de Peking a Paris par les missionaires il y a plus d'un an) à Lord Munster, dans un hyver qu'il a passé

ici, et je lui ai fais voir qu'il figuroit les peuples Etrangers de la Chine, et meme ceux de l'Afrique, et donnoit la titre de toutes les productions de leur pays, et des details sur le commerce que lui y pouvoit faire, et je suis surpris qu'a son retour à Londres, Lord Munster n'aie pas engagé la Société des traductions a faire traduire a Paris, par M. STANISLAS JULIEN, cet ouvrage si important, pour la puissance Angloise dans les Indes et chez les Birmans. Ce livre a été entièrement parcouru par moi, et souvent cité dans la belle Histoire des Huns de M. DEGUIGNES le pere, mais ce qui manque a l'Europe c'est la traduction complete, et possible en ce moment je le répéte, encore. J'en ai aussi entretenue M. LE BARON DE HUMBOLDT par ecrit; il est actuellement a Paris et je ne doute pas qu' il ne s'en occupe un jour.

"J'ai voulu, Monsieur le Préaident, appeler aussi votre attention sur ce livre si importan, qui n'existe pas à Londres autant que j'ai pu le verifier. Il seroit non moins utile, d'avoir une traduction complete des kiags et du Son Chon ancienne chronique, et des encyclopedies diverses publiées en Chine et au Japon, aussi bien que du Pentho Penggmon; je suis convaincu de leur haute importance. Je désire en convaincre aussi votre Honorable Assemblée.

"Je suis avec respect,
"Monsieur le Président,
"Votre tres humble et obeissant serviteur,
"CHEV. DE PARAVEY.

Ce 13th Septembre, 1838. Du Corps royal du génie, &c. &c.

The Secretaries were directed to acknowledge with thanks Mons. DE PARAVEY's communication, and to state that several works of more local interest must occupy the attention of the Society before they could urge on the government the expediency of undertaking the translation Mons. DE PARAVEY suggests.

Received through the Secretary to Government, General Department, Report on the Statistics of Azimgurh, by Mr. THOMASON, B.C.S.; also Journal of a Tour in Bootan, by Dr. W. GRIFFITHS, Medical Establishment.

Read an application from PARMCHAUND Pundit, offering to make over to the Society the commentary of the 2nd part of the "*Nyeshadha*," which he has been given to understand the Society is willing to publish; with a request that his labours for such compilation may be taken into the consideration of the Society.

Proposed by the President, seconded by Capt. FORBES, carried nem con, that Mr. SUTHERLAND be requested to report on the subject at the next Meeting.

Daily Observations of the Tides at Singapore for December 1838, and January 1839, were presented by W. SCOTT, Esq.

Museum.

Read a letter from Dr. C. GRIFFITHS, forwarding for presentation to the Museum a locust picked up by him at the Cape of Good Hope in December last.

Read extracts of a private letter to Dr. O'SHAUGHNESSY from Lieut. Col. STACY, communicating drawings of coins discovered on his journey to join the Army of the Indus.

* * * "You may rest assured, I will keep you informed of any thing which comes to my knowledge, and which I suppose may be interesting to you; but keep in mind, that the natives bury, and remove every thing they can on the approach of an army; and therefore, that I can expect no success in my researches, until we take Cabul. Through

the kindness of Moonshee MOHUN LAL, I have received introductions to the bankers of Kandahar and Cabul: through their agency, I expect to procure coins, gems, and every thing antique, which money and zeal in the cause can procure; and I hope I shall be able to make such arrangements, when on the spot, as may secure to me the result of their future exertions. Not a coin shall pass into other hands, if I can prevent it. At Cabul I shall have some trouble perhaps; but we have this satisfaction, that if I should fail to secure any coins, they will fall into the hands of our countrymen, and they will communicate them to the Society. I had better begin the subject of coins in the order or date of my great good fortune. First, when travelling dâk, I had the pleasure of meeting Dr. FALCONER on his return from Cashmere; he immediately opened his treasures, gave me over almost all he had, desiring I should select such as I required for my cabinet. Although no new coin turned up, still there are three of KADAPHES CHORANUS, which will be very useful, as having the legend on the reverse complete; there are some others also, which will be very useful in completing readings, which, at present, are rather doubtful.

"My next donation was from Colonel Sir ALEXANDER BURNES: of his modern coins I will speak, when I have more time. In six small packets are Bactrian, Indo-Scythic, &c. which though published, will still be useful, as they assist in forming a comparative table of the various sites where these coins prevail. One coin in these packets deserves notice, viz. a copper coin of AZES—of capital workmanship and very complete—similar to fig. 2, pl. 22, vol. 4, June 1835, Journal Asiatic Society. Three circular copper coins of a dynasty as yet unknown, complete the valuable present of Col. BURNES: they deserve a more detailed description than I can give of them in Camp, without books of reference. I will describe them as well as I can, and send you sealing wax impressions by the first opportunity, into which you can cast Plaster of Paris.

"No. 1, *Obv.* Royal bust facing to the left, in high relief; handsome and expressive features; beard; head-dress difficult to describe; has the appearance of two large rosettes, composed the upper of six and lower of seven small circular bunches of flowers or jewels; the royal fillet passes between these, and is tied behind in a very peculiar triangular bow. Dress magnificent; collar round the neck equally so; legend in Greek characters—the three first are indistinct—they appear to me ΔCΔΛΚΟΡΗC BASILEUS, the remaining letters [illegible]. *Reverse.* An angel in outline, facing to the right, holding out a fillet in her right hand; the legend, beautifully executed, is in a character assimilating to, but more ancient, than the writing in the principal deposit of the Manickyala Tope—Monogram [illegible]



"No. 2, is also a copper coin in high relief, and only less beautiful than No. 1. Royal bust facing to the left—evidently of the same dynasty. A less able execution of the medal, and a deteriorated Greek character, stamp it as subsequent to No. 1. Bearded—hair straight on the crown of the head—fillet with the same peculiar triangular bow as No. 1—below the fillet three rows of curls—dress much the same as No. 1—collar richer. It must be regretted that the greater part of the letters of the name are injured—after cleaning the coin with the greatest care, it appears Δ ⊃ ρ θ Δ ν ΗC * *, the remaining letters are lost. *Rev.* An angel facing to the right, in outline, holding out a fillet in her right hand—half of the legend is distinct—approaches nearer to the writing in the principal deposit Manickyala Tope—Monogram



Δ ⊃ ρ θ Δ ν Η C

"No. 3. This coin was in such a ruinous condition, that I had no hopes any exertions would ever enable me even to class it; but I have been more fortunate than I expected. I think it should be placed as first of this series. It is evident it belongs to Nos. 1 and 2; equally so, that it is of some other king, for the Monogram is on the obverse—a star with five points. The head dress is the same—the ends of the fillet are more gracefully disposed. Style of Greek character the same as on No. 1. Only a few letters of BASILEUS remain. *Reverse.* An angel facing to the right—instead of being in outline the angel is filled in, and in a most graceful attitude—the traces of letters only remain, but as far as they allow of an opinion, I should say of a different alphabet from Nos. 1 and 2.

"Nos. 1 and 2 bring to light the names of two kings before unknown. Monsieur JAQUET's corrected *Pehlevi* alphabet will enable you to judge if I have read the Greek legend correctly. To Colonel Sir ALEXANDER BURNES are we indebted for this discovery;—he does not allow his numerous and important duties to prevent his collecting ancient coins wherever they are to be had: he has dispatched servants in several directions to purchase them.

"My next good fortune was a donation from Moonshee MOHUN LAL; he shewed me all the coins he had, and desired me to select any I wished to possess. I accepted of sixteen—two of these are unique, but I am sorry to say, without legend. One *Obv.* a head in high relief, looking to the left. *Reverse*, a loose horse, trotting to the right—legend lost. The other a bust, badly executed, looking to the right—crown with many points—*Reverse* lost. From the appearance, I doubt if ever it had a reverse. These two coins are both unknown. A square bronze coin of EUCRATIDES. *Obv.* very complete, and in wonderfully good preservation, a splendid execution, not the least injured. *Reverse*, the two horsemen. Nothing can surpass the spirit and grace of this medal; I have no coin, nor do I remember seeing a coin of greater beauty. I also received a very pretty small coin of ERNAIOS or ERMÆUS; the others are coins already published. You may imagine how grateful I feel for these most acceptable donations. I hope on my return, that added to what my own exertions may enable me to collect, we may be able to give several names to the list of kings. I shall write from Kandahar."

Physical.

Read a letter from Lieut. Col. R. LLOYD, Resident at Darjeeling, forwarding a specimen and notice of a supposed Coal found near the Teesta river. On analysis it was found to be *iron* stone mixed with plumbago.

After the conclusion of the business of the Meeting Mr. JAMESON, the officiating Curator, read his report on the specimens of Natural History contained in the Museum of the Society.

The thanks of the Society were voted to Mr. JAMESON for the valuable service he has rendered to the Society, for the short time he has had the management of the Museum.

Meteorological Register, kept at the Assay Office, for the Month of April, 1839.

Forenoon, 10 A. M.														Afternoon, 4 P. M.											
Temperature.			Hygrometry.			Aqueous tension.			Weather.			Atmospheric Pressure.		Temperature.		Hygrometry.			Aqueous tension.			Weather.		
									Wind.													Wind.		
Well water.	Air.	Dew point.	Depression.	Differential thermometer.	Hair Hygrometer.	By Dewpoint.	By Wet bulb.	By Hair Hygrometer.	Direction.	Force.	Aspect of Sky.	Old Stand. Barometer.	Height at 32 Fah.	Air.	Dew point.	Depression.	Differential thermometer.	Hair Hygrometer.	By Dewpoint.	By Wet bulb.	By Hair Hygrometer.	Direction.	Force.	Aspect of Sky.
79,4	87,5	56,8	8,5	8,5	88	37	65	74	S. W.	3	cumuli.	29,762	29,754	91,7	45,2	14,3	14,8	77	22	47	54	S. o.	4	fine.
78,8	86,0	59,0	8,7	8,4	88	25	65	74	S. e.	1½	cl.	,740	,743	92,0		13,2	13,0	80		52	59	S. e.	2½	cum. few.
79,2	86,7	63,0	8,7	8,6	88	28	65	74	S. w.	1½	do.	,660	,656	96,4	49,0	20,5	21,7	64	22	33	36	S. w.	1½	do. small.
79,6	87,3	65,0	7,4	7,4	90	50	70	78	S. e.	1½	do.	,592	,584	97,0	51,5	16,0	17,2	72	23	45	66	S. E.	2	cum.
79,6	86,4	63,5	6,9	7,1	90	48	72	78	S. o.	3	cy.	,609	,614	93,4	57,5	12,3	13,0	82	31	55	63	S. e.	1½	do.few.ovrhd.
79,3	86,7	65,0	9,0	9,0	88	50	65	74	S.	5	cy. cir. str.	,629	,638	91,6	63,0	13,3	13,2	79	41	51	40	S. e.	3	cy. mist.
	89,3	63,0	11,6	12,0	83	44	55	65	S. e.	3	overct.	,612	,614	95,5	64,0	13,0	14,3	80	37	55	59	S. e.	2	fine.
79,4	88,1	62,0	11,9	11,6	80	43	54	69	s. w.	1	cy. haze.	,631	,634	91,3	53,3	16,2	16,1	73	29	41	48	s. w.	1½	do.
79,8	89,4		10,7	10,7	86		60	70	S. w.	1½	overct.	,671	,650	97,0	61,5	15,3	14,7	79	32	40	57	s. e.	1½	cum. nimb.
80,0	89,5		10,5	9,4	88		60	74	S. w.	2½	cum. sct. few.	,681	,666	97,8	55,7	16,5	15,0	77	26	45	54	S. E.	3	cy.
80,2	89,5	64,7	8,4	8,8	89	45	67	76	S. e.	2½	do. do. do.	,658	,625	94,3	55,4	13,9	15,0	78	29	50	56	e. s. e.	1½	overct.
80,3	89,7	65,0	8,0	8,0	89	47	69	76	e. s. e.	2½	fine.	,570	,544	94,2	64,5	11,5	11,6	84	39	59	66	w. s. w.	4	misty.
79,7	89,1	65,3	8,5	8,0	89	47	67	76	S. E.	4	cy. haze.	,539	,511	94,5	64,0	10,3	10,1	87	38	64	72	S. E.	3½	cir. cum. few.
80,1	91,0	68,7	9,2	8,7	88	49	65	74	e. s. e.	3	overct. cl.	,585	,533	95,9	65,0	12,3	11,9	83	38	57	65	S. E.	3½	fine.
80,3	89,9	69,6	9,2	9,2	87	53	65	72	s. e.	0½	haze.	,725	,655	93,7	71,0	11,3	11,2	83	50	60	65	o. E.	3	shy. threatg.
80,1	90,1	71,0	9,8	9,5	85	55	62	68	s. e.	1	cum. str.	,779	,690	96,1	55,0	16,5	15,9	76	27	45	52	o. E.	2	overct. cl.
79,9	89,7	70,0	13,2	14,2	80	55	50	59	s. E.	3	cir. cum.	,743	,652	93,8	61,5	14,6	16,0	79	37	50	57	S. w.	3	cir. cum.
80,3	89,7	73,5	8,8	10,0	89	61	66	76	S. e.	4	do. do.	,537	,522	96,0	62,5	13,3	12,0	83	34	55	65	S. o.	4½	nimb.shy.dk.
80,1	88,7	74,1	6,7	7,5	92	64	72	82	S. W.	5	cy. haze.	,485	,502	91,1	71,9	8,5	8,8	91	54	67	80	s. W.	2½	cir. cum. do.
80,3	90,9	74,7	7,8	10,1	89	60	70	76	S. W.	4	do.	,484	,464	91,0	71,1	8,5	9,0	90	59	67	89	S. e.	3	cy. do.
80,1	88,9	74,0	6,5	7,5	92	63	75	83	S. o.	4	do. threatg.	,486	,488	89,9	73,2	5,7	6,7	93	60	77	84	S. e.	3½	do. do.
79,5	87,1	76,3	7,3	8,8	89	70	70	59	S. W.	5	do. do.	,449	,426	95,5	64,7	15,5	16,8	79	37	47	57	S. e.	2	overct?
									S. W.															
80,2	90,9	75,7	8,7	9,1	90	70	67	78	S. W.	4½	cum. str.	,469	,481	92,1	74,0	6,1	6,3	91	57	43	80	n. e.	2	Storm.
80,5	90,5	76,0	7,2	7,9	91	71	72	80	S. W.	4	cir.cm.ovrhd.	,509	,480	92,2	77,0	8,0	8,7	91	63	70	80			cum.str.&cm.
79,8	88,8	68,0	8,9	9,2	88	51	65	73		3	Showery.	29,608	29,584	94,3	62,2	12,8	13,0	81	38	53	62		2½	Showery.

BEYOND THE LIMITS OF THE CITY OF MEXICO. 1 FOOT IN MEXICO EQUALS

JOURNAL

OF

THE ASIATIC SOCIETY.

No. 89.—MAY, 1839.

ART. I.—*Notice of Inscriptions in Behar, communicated by Mr.* RAVENSHAW. *By the Editors.*

We present our readers with a letter from Mr. RAVENSHAW, with which we received several copies and facsimiles of Inscriptions obtained by that gentleman during his tour in South Behar. We regret to say, that the most important and interesting of these impressions are so imperfect and confused as to baffle the attempts of the Pandit KAMALA KAUNT, who aided Mr. JAMES PRINSEP in his valuable discoveries. We allude particularly to the inscriptions on the inverted column in the fort of Behar. They are in the Sanscrit language, and character. Nos. 1 and 2 are duplicates taken on sized paper. The letters on the one have been inked on the obverse side, and on the other on the reverse. The only word yet deciphered is "*Srenayah,*" "orders," "files." From No. 3 of the same pillar these Sanscrit words have been discovered—"*labdhopáya xetropari ku-kriya tyá(jyá)* any "evil act against land obtained by any means, should be avoided."

Nos. 4, 5, 6, and 7, are in the same character and language, taken from the ruins of *Baudhist* statuary at *Barahgaon.* They appear to contain *Baudhist* moral sayings; example—

"*Ye dharma hetu prabhavah teshām hetun Tathágutam avagachchh.*"

"Know BUDH to be the author of those things which proceed from virtue as a cause."

We suspect that the image at this place (so described by Mr. RAVENSHAW) cannot be BHAIRAVA. The terrific SIVA would be certainly misplaced amongst the peace-loving divinities of the *Baudhists.*

No. 8 is in the *Deva Nagri*, and belongs to a class of inscriptions bearing the name of NA'YKA PRATA'PA DHAVALA DEVA RAJA of *Japila*. They are described by Mr. COLEBROOKE in the first volume of the Transactions of the Royal Asiatic Society (page 201), on inspection of the facsimiles taken by Dr. BUCHANAN.

No. 8 is that translated by that distinguished orientalist. "It is (to borrow his words,) "an inscription on a rock, denominated, from an "idol delineated on it, *Tárachándi*, in the vicinity of *Sahusram*, in "South Behar; and contains the protest of a chieftain named PRA-"TA'PA DHAVALA DE'VA, bearing the title of *Náyaca* and that of *Rája* "of *Japila*, against an usurpation of two villages by certain *Bráh-*"*mánas* in his neighborhood, under colour of a grant, surreptitiously "obtained through corruption of his officers, from the Rájá of *Gâdhi-*"*nagara* or *Cányacubja (Canój)*, who was the celebrated VEJAYA-"CHANDRA. Its date is 1229 Samvat, corresponding to A. D. 1173."

The obliteration of the first digit has led Mr. RAVENSHAW to impute to these inscriptions an age more remote by one thousand years than the true era.

No. 9 belongs to the same class, but is not described by Mr. COLEBROOKE. The transcriber of No. 8 seems to have been no great scholar; but the transcriber of No. 9 is evidently quite illiterate. He introduces his own *Lala* letters where they differ from the *Deva Nagri*, and is baffled by the conjunct letters. From what is deciphered, this appears to commemorate, by the Raja the construction of a road, "like steps" from the *Pratabali* river to the top of the adjoining hill, on which are impressions of the feet of VISHNU and CHANDI. The seal of BHIKU Pandit, the composer of the inscription, is on the slab, which besides the fact commemorated, records some notice of this redoubtable Raja's family. Parts of the slab are obliterated, but the transcription of what is legible by a scholar, would enable us to give a more correct analysis of its contents.

The impression of No. 10 is as imperfect and confused as those of Nos. 1, 2, and 3; so that we must wait the receipt of a more correct impression before we can hope to arrive at the contents of this stone.

The four Persian inscriptions communicated by Mr. RAVENSHAW, require little comment in addition to the notice by that gentleman. From the first, we learn that in the time of AKBAR "his servants had thousands of powers," and that SAID SURFARAZ KHAN, (one of them perhaps) founded the *Musjid*, "a sublime shrine. He was a pious man, as it were a sacred *parterre* in spring."

From the second we learn, that MUNIR *Raj* built "this tomb of the IMAM of age."—In these verses the Prophet is piously apostrophized.

The third informs us, that in the reign of SHAH JEHAN the Just, HABIB SUR (the *Raj* no doubt) constructed the basin of SHARAF-AD-DIN, and "repaired *(babast)* and made this sublime *Id-gah*, and the brick pavement." Mr. RAVENSHAW informs us, that this saint died in 782. A.H. The dedication of the basin is therefore a posthumous honor.

In the last line of the third couplet of the epitaph on IBRAHIM BAYU we have hazarded a correction,—*Kin-toz* for *Kin-loz*. The first, however unusual as a compound, may mean *zealous* or *fervent*, the second has no sense. This good man it seems "was royal in his disposition, and in religion as fervent as Abraham." He died in the month of Hajj on a Sunday. The line obliterated would have supplied the date. The concluding line prays "that God may make easy his last account."

A correct plate of Mr. RAVENSHAW's sketch of the tower of JARA'-SANDHA near *Girik* is annexed. Mr. RAVENSHAW has detailed the *pauranic* legend of this '*Asur*,' demon, *(not Assyrian)*. The term is given to the foes of KRISHNA. KANSA, the slain son-in-law of JARASANDHA, and the uncle of KRISHNA, is so called, (See WILSON's Dictionary.)

We are much mortified, in being obliged to send forth this Number without an analysis of the inscriptions on the inverted column in the fort and on the stone on the hill near *Sasseram*, now called *Chandan-Shahid*,—of course from some *Moslim* devotee. They may, we think, afford interesting historical facts. We wish Mr. RAVENSHAW, or any other friend to antiquarian research, could find the opportunity of taking more perfect facsimiles. Captain BURNS would render important service if he would describe minutely the best process and fittest materials for taking accurate facsimiles from engraved slabs. In the meantime we suggest that other impressions be taken on damp or sized paper, and that they be sent to us without any attempt to delineate in ink the letters either on the concave or convex faces. If they be sent in duplicate the chance of being deciphered is greater.

The slab to which Mr. RAVENSHAW refers at the close of his valuable letter has been received, and will be noticed in an early Number. We now pass on to that gentleman's letter.

To the Secretary of the Asiatic Society, Calcutta.

SIR,

I have the pleasure to forward for the inspection of the Society, a few inscriptions collected by me in a late tour through the district of Behar, in the hope that some of them may prove to be new, and useful in illustrating the history of the country. No. 1, is an inscription on a stone pillar found among the ruins of the fort of Behar.

The fort is supposed by Buchanan* to have been built by the Maga Rajas, who during the first three centuries after Christ ruled over this part of the country, then called *Magadha,* and indeed still called *Magad* by the lower orders of natives to this day. The shaft of the column is about eleven feet high, being a fragment only of the original pillar. It is situated on the high ground, a little to the west of the northern gate of the fort. Its original position is said to have been in front of the gate ; on removing it to its present site, the pillar was erected in a reversed position, with its base in the air, and its summit in the ground.

Various expedients were tried, in order to take off the inscription ; but wax, sealing wax, and the ordinary method of inking the pillar, and taking the impression on damp paper, alike failed. At last I had recourse to sized paper, which being pressed while damp carefully into the letters, retained the form of them when dry. In No. 1, the cavities of the letters have been filled with ink. In No. 2, which is another copy of the same inscription, the reverse or embossed side has been inked. The latter appears the best copy, and if the paper be held up to the light the characters can be as distinctly traced as on the other. No. 3, is a copy of an inscription on the upper (really lower) part of the column.

As I have never seen any characters which resemble those on the Behar column, I shall be glad to learn from your Society by what name they are designated, and to what era they belong. It is singular that Buchanan should not have alluded to this pillar in his description of the fort of the Magas while giving an account of the numerous Boodhist images, &c. scattered among the ruins.

There are several ancient Mahomedan buildings in the town and its vicinity, which are likewise unnoticed by Buchanan. The principal one is the tomb or Durgah of a holy saint, styled Huzrat Mukdoom Ool Moolk Shah Shureef Oodeen. There is an inscription in the *Cufic* character over the entrances to the Durgah, which, however, time has rendered illegible, with the exception of the date of the death of the saint, 782 Hijree, (1380 A. D.) and of the erection of the tomb, 977 Hijree (1569 A. D.) The Durgah is held in great veneration by the Mahomedans, who at the *Oors,* or anniversary of the death of the saint assemble from all parts of the country, it is said to the number sometimes of 50,000. This ceremony takes place in December. The tomb, the adjoining mosque, and other buildings, are illuminated, and prayers are offered up for the dead and the living.

* Page 89, in Martin's Eastern India.

Extensive endowments of rent-free lands have been granted at different times by Emperors, Amils, and pious Mahomedans, for the support of the shrine, the administration of which, is entrusted to a *Sujadah Nusheen*, an hereditary officer, to whom great reverence is paid by the Faithful. But a great portion of the lands has been alienated either to relations of the family, or in satisfaction of debts of former incumbents, and a great part has become liable to assessment under the Resumption Laws; so that little now remains for the support of the family, the splendour of religious festivals, or the maintenance of the Moolvees who were wont to teach to the rising generation the doctrines of the law and the tenets of the Prophet.

The following inscription is on the *Joomah Musjid*, date 1004 Hijree, in the reign of Akbar.

درزمان اکبر غازي شه عالم پناه چاکرانش راهزاران اقتدار
هم بیمن حضرت خان سعید سرفراز مسند عالي بناء مسجد کرد اختیار
بسکه ازفیض مقدس میشود ظاهر درو روضهٔ قدسي است گوي اندر بهار

سال تاریخش چواز پیر خرد جستم بگفت
رفت بود از هجرت خیرالبشر الف وچهار

The *Imambarah* has the following inscription, dated 1175 Hijree.

سنه ۱۱۷۵ هجري

منیري راج بتوفیق ایزد سبحان بنانمود چو این مدفن امام زمان
هزارو یکصدوهفتادو پنج گشت شمار زهجرت نبي ان سرور صغاروکبار

بکن تو حشرم یارب بسایهٔ حسنین
بحق احمد مختار شافع کونین

The subjoined is in a tank and *Eid Gah*, date 1065 Hijree, in the reign of Shah Jehan.

بدورشاه جهان بادشاه عدل گزین حبیب هوربناکرد حوض شرف الدین
وعیدگاه معلاش وفرش خشتي آن به بست وساخت بعون خدادرین دوران

هزارو پنج و شش سال هجرت آن سرور
که شد تمام بماه صفر بخیر و ظفر

At the distance of about three miles west of the town is a singular hill called *Peer Puhury*, from the tomb of a *Peer*, or saint, situated on the summit. His name was Huzrat Ibraham Byjoo, who from the subjoined copy of the inscription over the tomb appears to have died in 753 Hijree, (1352 A. D.,) or nearly five centuries ago, during the reign of the Patan monarch Feroz Sooltan, and about forty or fifty years before the invasion of Tymoor. This inscription is so far important that it verifies the date assigned to Feroz Shah being Slārā Rajab by Ferishta.*

سنه ۷۵۳ هجري

تاریخ وفات حضرت ابراهیم بیو

بعهد دولت شاه جهان گیر که بادا درجهان ملک نوروز
شهنشاه جهان فیروز سلطان که برشاهان گیتي گشت فیروز
ملک سیرت ملک بیّو براهیم که بد دردین چو ابراهیم کین توز
بماه ذي الحجه یکشنبه از روز

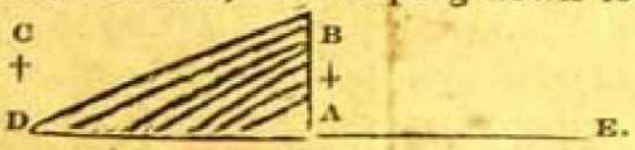
(*Line illegible.*)

به هجرت هفتصد وپنجه سه تاریخ مسافرشد ملک درجنت این روز
خداوندا بفضل خویش بروي کني آسان حساب آخرین روز

The tomb is a common square building, surmounted by a dome. The hill on which it stands is a very remarkable one. It is composed of cuboidal masses of crystallized sandstone having a fanciful resemblance to horn, and thence called by the learned, "Hornstone." The upper part of many of the rocks is soft sandstone, while the lower is crystallized; this is probably owing to decomposition, but the natives conceive it to be a new accretion, and maintain that the rock grows, "*jeeta*," a not uncommon idea even in England.

* Vide Prinsep's Useful Tables, page 147.

The hill is about 300 feet high, composed of stratified masses of the Hornstone. It is quite perpendicular to the east, and sloping down to the west at an angle of about 40°



Other hills are generally in the shape of cones, but this seems to have been upheaved by a sudden force in the direction A B or of C D, snapping the subjacent crust, without disturbing the contiguous plain E. This perpendicular rock extends about a mile or more north and south, and there is no other hill within twelve miles. The character of the Behar Hills in general is very peculiar, being unlike that of any other country I have visited. They rise up out of the level plain in small conical isolated peaks from 200 to 300 feet high, apparently unconnected with each other, or any range of mountains. They are composed of a variety of rocks, coarse granite, hornstone, jasper, hornblende, &c. all mixed together without order, and all appearing to have undergone some degree of fusion. They suggest the idea that they existed previous to the plain which surrounds them, for if they had been forced up from below, the adjacent plain would have been upheaved with them in some degree; whereas it is as flat as possible up to their very base. It seems not improbable, therefore, that they originally formed the summits of a range of mountains, the vallies of which were subsequently filled up, forming the bed of some pre-adamite ocean. But I have forgotten the inscriptions in this geological speculation

The inscriptions numbered 4, 5, 6, and 7, were taken from the pedestals of statues of Boodha found at Baragaon, about seven miles west from the town of Behar, which Buchanan conceives to have been the residence of the Maga Rajas. Three or four high mounds composed of ruins of some large brick buildings are all that remain to attest its ancient grandeur. The Boodhist images lying about in all directions are very numerous; that of *Bhyroo* is of colossal dimensions, and made of granite.

Enclosed is a rough sketch* of a very remarkable tower about sixty feet high, and as many in circumference, situated on the summit of a hill 800 feet high, near Girick, about seven or eight miles from Rajgeer (*Rajgiri*) the ancient capital of Jarasanda, an Asur, or Assyrian, the contemporary of Chrishna, and who is supposed to have reigned over the country of Magadha, or Madhyadēs, about 1200 years before Christ.

* See Plate.

According to tradition, and the *Mahabharut,* Chrishna murdered the Raja of Mathurah, who was the son-in-law of Jarasanda, in order to obtain his dominions; upon which Jarasanda waged war with the Eastern Apollo, and compelled him to fly with all his milk maids to the west coast of India. Some years after, however, having obtained the aid of the Pandava Princes he returned with an army headed by Bheem and Arjuna. At Girick a pitched battle was fought, and Jarasanda is said to have fallen by the hand of Bheem. A detailed description of the pillar is to be found in Buchanan, page 79. It is called by the natives the *Bythaki,* or seat of Jarasanda; but it is not improbable that it may have been erected either in commemoration of his victory over Chrishna, or of his death in the final battle. It is a solid brick building, without any inscription or image; about two-thirds of the height from the ground there are three projecting cornices about a foot apart, the intervals being decorated with carved ornaments, the principal of which is a *gurha,* or vessel for holding water.

The inscriptions of Nos. 8, 9, and 10, were presented to me at Sasseram by Shah-Kubeerood-Deen, the *Syjadah Nusheen* of a religious endowment at that place.

No. 8 was taken at Tarachundee, two miles south-west from Sasseram; the date is 3rd Jeyte 229 Sumbut (A. D. 172), and Raja Dowul Pertab is the author.

No. 9 is an inscription on a rock by the same Raja, at a place called Amjur, near Phoolevaria, ten miles south from Sasseram—the date is Bysack 2nd, Sumbut 229, or A. D. 172.

No. 10 is an inscription found on a stone at the summit of a hill near Sasseram, called *Chundun-Shaheed.* It is in the ancient character of the Allahabad and Bettiah Pillars, the decyphering of which has conferred immortal honor on the name of JAMES PRINSEP. The following inscription is taken from the gateway of the palace on the summit of the celebrated hill fortress of Rhotas. From this it appears that the palace was built in 1005 Hijree, (1596, A. D.) by Raja Man Sing, viceroy of Behar and Bengal in the time of Akbar.

آنچه بردروازهٔ محل قلعه رهتاس نوشته است

دروازه مقیم بناي چوشد تمام دروازه سپهر زرشکش سقیم شد
سال عمارتش چونمودم بطبع گفت ازراجه مان سکه بناي مقیم شد
تحریر فی التاریخ بست و هشتم شهر رجب المرجب سنهٔ هزار و پنج

The Sungskrit inscription at the Kothoutiga gate of the fort, alluded to by Buchanan, page 432, was, I believe, brought to Chuprah by Mr. Walter Ewer, and is at present in the grounds of Mr. Luke's house. I shall endeavour either to forward the original, or a copy to the Asiatic Society.

I have the honor to be,
Sir,
Your most obedient servant,
E. L. RAVENSHAW.

CHUPRAH,
21*st April*, 1839.

P. S.—Since writing the above Mr. Luke has promised to forward the slab by a boat which is about to start for Calcutta.

ART. II.—*The "Mahimnastava," or a Hymn to Shiva; with an English translation. By the Rev.* KRISHNA MOHANA BANERJI.

The well-known invocation to SHIVA, of which an English translation is presented to the public, together with the original, in the following lines, is held in high repute among the Hindus. It purports to be written by PUSHPADANTA, chief of the *Gandharvas*, who was in the habit of stealing flowers, for the purpose of worshipping SHIVA with them, from the garden of king VA'HU, unseen by the keepers of the garden. As he was gifted with the power of walking in the air he baffled for a long time all the efforts of the keepers to catch him, who observed every morning large quantities of flowers stolen away, but could not ascertain how the thief got into the garden by night, in spite of all their watchful vigilance. They suspected at last that it was a being capable of flying that committed the robbery night by night, and left in several places some holy flowers sacred to SHIVA, with the hope that the thief might tread upon them in the dark and be deprived of his supernatural powers, in consequence of the curse which such an insult to those sacred mysteries would necessarily bring upon him. The plan had the desired effect. The *Gandharva* trod upon the sacred flowers, and lost his power of riding on the wind. He was accordingly caught and taken into custody, when, through fear of the king whom he had offended by stealing his flowers, he offered the following supplication to SHIVA.

In the translation of this composition I have consulted the *scholia* of a learned commentator, as well a version in the Bengalee language, both of which have been printed with the text. As all classes of the

Hindus are allowed the privilege of worshipping SHIVA, this hymn is distinguished from invocations to other gods by the liberty with which it may be read and repeated even by the *Shudras*, and it is therefore more widely known among the natives than the other prayers and mantras with which the Brahmins alone are familiar, because they alone are allowed to use them.

महिम्नः पारन्ते परमविदुषो यद्यसदृशी
स्तुतिर्ब्रह्मादीनामपि तदवसन्ना स्त्वयि गिरः ।
अथावाच्यः सर्वः स्वमतिपरिणामावधि गृणन्
ममाप्येष स्तोत्रे हर निरपवादः परिकरः ॥१॥

If the offering of praise by one that does not comprehend the supreme limits of thy glory be unworthy of thee, then the language even of BRAHMA' and the other gods must be deficient. No one therefore that sings according to the measure of his understanding is culpable—and this attempt of mine too, O HARA! to celebrate thy praise, may be excused.

अतीतः पन्थानं तव च महिमा वाङ्मनसयो
रतद्व्यावृत्त्या यं चकित मभिधत्ते श्रुतिरपि ।
स कस्य स्तोतव्यः कतिविधगुणः कस्य विषयः
पदे त्वर्वाचीने पतति न मनः कस्य न वचः ॥२॥

Thy glory, incapable as it is of any definition, and described with awe even by the Vedas, surpasses the utmost stretch of thought and expression. Who then can duly set forth its praise? Who can comprehend its nature and properties? And yet as to its figurative illustrations, vouchsafed by thee in condescension to the infirmities of the faithful, who would not set his mind upon them and give expression to them?

मधुस्फीतावाचः परममृतं निर्म्मितवतः
स्तव ब्रह्मण् किंवागपि सुरगुरोर्विस्मयपदं ।
मम त्वेतां वाणीं गुणकथनपुण्येन भवतः
पुनामीत्येतस्मिन् पुरमथन बुद्धिर्व्यवसिता ॥३॥

Can the word even of the chief of gods (BRAHMA') be a matter of wonder to thee who art the cause of the nectar-like sweets of language? My mind is thus bent upon this invocation, O thou destroyer of TRIPURA, to the end that I may purify my language by the virtue of recounting thy attributes.

तवैश्वर्य्यं यत्तज्जगदुदयरक्षाप्रलयकृत्
त्रयीवस्तु व्यस्तं तिसृषु गुणभिन्नासु तनुषु ।
अभव्यानामस्मिन् वरद रमणीयामरमणीं
विहन्तुं व्याक्रोशीं विदधत इहैके जडधियः ॥४॥

Thy godhead, celebrated in the Vedas, and displayed in the threefold forms of BRAHMA', VISHNU, and SHIVA, distinguished severally by the three properties of *Sattwa Rajas*, and *Tamas*, is the cause of the creation, preservation, and annihilation of the universe; and yet there are certain foolish and stupid men in the world who oppose this thy godhead in an abominable way, however acceptable that way may be to the wicked.

किमीहः किं कायः सखलु किमुपाय स्त्रिभुवनं
किमाधारो धाता सृजति किमुपादान इतिच ।
अतर्क्यैश्वर्ये त्वय्यनवसरदुस्थो हतधियः
कुतर्कोयं कांश्चिन्मुखरयति मोहाय जगतः ॥५॥

"What is his attempt? What his form? By what means—with what implements—of what materials does the Creator form the universe?" Vain questions like these, unworthy of thy incomprehensible glory, and therefore wicked, pass the lips of some infatuated men for the delusion of the world.

अजन्मानो लोकाः किमवयववन्तोपि जगता
मधिष्ठातारं किं भवविधिरनादृत्य भवति ।
अनीशोवा कुर्य्याद्भुवनजनने कः परिकरं
यतो मन्दा स्त्वां प्रत्यमरवर संशेरत इमे ॥६॥

Can this embodied universe be uncreate? Could its existence proceed from any one except the Creator of the world? Or who else but the

Lord could attempt the production of the world? The wicked, regardless of these considerations, indulge in scepticism concerning thee, O thou supreme of immortals!

त्रयी साङ्ख्यं योगः पशुपतिमतं वैष्णवमिति
प्रभिन्ने प्रस्थाने परमिदमदः पथ्यमितिच ।
रुचीणां वैचित्र्यादृजुकुटिलनानापथजुषां
नृणामेको गम्य स्त्वमसि पयसा मर्णवईव ॥७॥

While the Vedas, the Sánkhya philosophy, the Yoga shástra, the system concerning the creature and the creator, the doctrine of the Vaishnavas, &c. involve many conflicting theories and sentiments of which some follow this, some that—and while there are consequently different kinds of men pursuing various paths, straight, as well as crooked, according to the diversity of their opinions—thou art alone the one end of all these sects, as the sea is of different rivulets.

महोक्षः खट्वाङ्गं परशुरजिनं भस्म फणिनः
कपालञ्चेतीयत्तव वरद तन्त्रोपकरणं ।
सुरास्तां न्तां मृद्धिं दधति च भवद्भ्रूप्रणिहितां
नहि स्वात्मारामं विषयमृगतृष्णा भ्रमयति ॥८॥

A large bull, a wooden staff, an axe, a tiger or elephant's hide, ashes, snakes, and a skull—these, O thou dispenser of blessings, are thy principal ornaments and furniture. The other gods are indeed tenacious of this and that enjoyment, all which thou mayest call forth by a mere turn of thy eye—but a feverish thirst after such objects cannot disturb a self-contented being.

ध्रुवं कश्चित् सर्वं सकल मपर स्त्वध्रुवमिदं
परो ध्रौव्याध्रौवे जगति गदति व्यस्तविषये ।
समस्ते ष्येतस्मिन् पुरमथन तैर्विस्मित इव
स्तुवन् जिह्रेमि त्वां न खलु ननु धृष्टा मुखरता ॥९॥

One philosopher* says that every thing is eternal; another† says that every thing here is perishable; while a third‡ maintains that in

* KAPILA, the founder of the *Sánkhya* philosophy.

† BUDDHA, the last pretended incarnation of the Deity, from whom originated the sect which goes by his name.

‡ GOUTAMA the founder of the *Nyáya* philosophy.

this universe, composed of various materials, some things are eternal, others perishable.—Although I am in a manner bewildered by these speculations, I am not still ashamed of setting forth thy praise, for my tongue cannot be held.

तवैश्वर्य्यं यत्नाद्यदुपरि विरिञ्चिर्हरिरधः
परिच्छेत्तुं यातावनल मनिलस्कन्दवपुषः ।
ततो भक्तिश्रद्धाभरगुरुगृणद्भ्यां गिरिश यत्
स्वयं तस्थे ताभ्यां तव किमनुवृत्ति र्न फलति ॥१०॥

In order to estimate thy glory, who art fire and light, BRAHMA attempted in vain to measure its upper and VISHNU its lower part.—But when they sang thy praise with faith and devotion, then thou didst manifest thyself unto them. Can then thy service ever be pronounced futile or fruitless?

अयत्नादासाद्य त्रिभुवन मवैरव्यतिकरं
दशास्यो यद्बाहूनभृत रणकण्डुपरवशान् ।
शिरः पद्मश्रेणीरचितचरणाम्भोरुहबलेः
स्थिराया स्त्वद्भक्ते स्त्रिपुरहर विस्फुर्जितमिदं ॥११॥

It was only owing to the unshaken faith with which he worshipped thy lotus-feet with his heads, as with so many rows of lotuses, that, O thou destroyer of TRIPURA, the ten-headed RA'VANA having gained unrivalled and undisturbed possession of the world exerted the strength of his arms, ever itching for war.

अमुष्य त्वत्सेवासमधिगतसारं भुजवनं
बलात् कैलासेपि त्वदधिवसतौ विक्रमयतः ।
अलभ्या पातालेप्यलसचलितङ्गुष्ठशिरसि
प्रतिष्ठा त्वय्यासीत् ध्रुव मुपचितो मुह्यति खलः ॥१२॥

When he (RA'VANA) exerted against *Kailásha*, even thy dwelling, the power of those very arms which he had got as a reward for his services to thee, (so true it is that the wicked forget themselves in prosperity!) it would have been impossible for him to find any resting place, even in hell, hadst thou only slightly moved the tip of thy toe. [*But thy long-suffering remembered his former devotions, and spared him.*]

यदृद्धिं सूचाम्नो वरद परमोच्चैरपि सती
मधश्चक्रे बाणः परिजनविधेयत्रिभुवनः ।
न तच्चित्रं तस्मिन् वरिवसितरि त्वच्चरणयो
र्न कस्या उन्नत्यै भवति शिरसस्त्वय्यवनतिः ॥१३॥

That VA'NA, who had reduced the whole world under his subjection, should pull down the dominion of INDRA, although so high, was not a matter of wonder; because he worshipped thy feet. What elevation is there which the prostration of the head before thy feet could not procure!

अकाण्डब्रह्माण्डक्षयचकितदेवासुरकृपा
विधेयस्यासीद्य स्त्वनयन विषं संहृतवतः ।
सकल्माषः कण्ठे तव नु कुरुते न श्रियमहो
विकारोपि श्लाघ्यो भुवनभयभङ्गव्यसनिनः ॥१४॥

Does not the blue spot which coloured thy throat, when thou drankest the deadly potion in pity to the gods and demons, who were all afraid that the universe should have an untimely dissolution, serve to set forth thy beauty? Surely even a disfigurement becomes graceful in a person who undertakes to relieve the world from fear.

असिद्धार्था नैव क्वचिदपि सदेवासुरनरे
निवर्त्तन्ते नित्यं जगति जयिनो यस्य विशिखाः ।
स पश्यन्नीश त्वामितरसुरसाधारण मभूत्
स्मरः स्मर्त्तव्यात्मा नहि वशिषु पथ्यः परिभवः ॥१५॥

That victor, whose shafts were never discharged in vain in this world consisting of gods, demons, and men, even KANDARPA, met with dissolution when he looked upon thee, O Lord, as if thou wert like any other common god. So impossible is it to despise the self-controlled with impunity!

महीपादाघाताद्व्रजति सहसा संशयपदं
पदं विष्णो र्भ्राम्यद्भुजपरिघरुग्नग्रहगणं ।

मुहुर्द्यौर्दौस्थ्यं यात्यनिभृतजटाताडितततटा
जगद्रक्षायै त्वन्नटसि ननु वामैव विभुता ॥१६॥

The safety of the earth became doubtful by the stamp of thy feet—the firmament became giddy and unstable, with all its stars and luminaries, shattered by the stroke of thy hand—and the heavens, touched by thy clotted hair fell into a troublous state, when thou dancedst in order to defend the universe from the *Rakshases*. How mysterious and seemingly contradictory must be this thy providence, by which thou didst thus trouble the creation while thou wert in fact effecting its preservation!

वियद्व्यापी तारागणगुणितफेणोद्गमरुचिः
प्रवाहो वारां यः पृषतलघुदृष्टः शिरसि ते ।
जगद्द्वीपाकारं जलधिवलयं तेन कृतमि—
त्यनेनैवोन्नेयं धृतमहिमदिव्यं तव वपुः ॥१७॥

Those streams of the *Ganga* which extend far in the sky, whose frothy appearance is that of clusters of sparkling stars, which replenished the mighty ocean, forming it like a great ring round the insular earth, looked a small drop when thou didst sustain them on thy head! What a glorious conception does this give of thy wondrous and majestic body!

रथक्षौणी यन्ता शतधृतिरगेन्द्रो धनुरथो
रथाङ्गे चन्द्रार्कौ रथचरणपाणिः शर इति ।
दिधक्षोस्ते कोयं त्रिपुरतृणमाडम्बरविधि
र्विधेयैः क्रीडन्त्यो न खलु परतन्त्राः प्रभुधियः ॥१८॥

When thou didst resolve upon consuming TRIPURA, the earth was thy chariot, BRAHMA' thy charioteer, the chief of mountains (*Mandara*) thy bow, the sun and moon thy wheels, and VISHNU himself thy arrow! What was all this preparation against a city that was but as grass before thee? Not that the will of the lord was dependent upon any instruments, but that thou wert pleased, as it were, to sport with those implements.

हरिस्ते साहस्रं कमलबलिमाधाय पदयो
र्यदेकोने तस्मिन् निजमुदहरन्नेत्रकमलं ।
गतो भक्त्युद्रेकः परिणति मसौ चक्रवपुषा
त्रयाणां रक्षायै त्रिपुरहर जागर्त्ति जगतां ॥१९॥

When HARI (VISHNU), who was daily in the habit of worshipping thy feet with a thousand lotuses, found on a certain occasion that the number was short by one, he plucked one of his lotus-eyes to fill up the want. Then did the fulness of his faith, thus tried and approved, become, by means of his wheeled body, the watchful principle of the world's conservation.

क्रतौ सुप्ते जाग्रत्त्वमसि फलयोगे क्रतुमतां
क्व कर्म्म प्रध्वस्तं फलति पुरुषाराधन मृते ।
अतस्त्वां सम्प्रेक्ष्य क्रतुषु फलदानप्रतिभुवं
श्रुतौ श्रद्धां बध्वा दृढपरिकरः कर्म्मसु जनः ॥२०॥

The sacrifice being ended, thou alone remainest as the cause of reward to its performers. How can a work that is finished and has ceased, be efficacious afterwards, except because of thy worship? It is accordingly only by looking up to thee as the pledge of reward in sacrifices, and by reposing faith in the *Vedas*, that a person can be said to commence a great work.

क्रियादक्षोदक्षः क्रतुपति रधीशस्तनुभृता—
मृषीणामार्त्विज्यं शरणद सदस्याः सुरगणाः ।
क्रतुभ्रंशस्त्वत्तः क्रतुषु फलदानव्यसनिनी
ध्रुवं कर्त्तुः श्रद्धाविधुर मभिचाराय हि मखाः ॥२१॥

Although DAKSHA* so perfect in works, and lord of all creatures, was the offerer—although *Rishis* were the priests, and gods the assembled partakers of the sacrifice, yet was it interrupted and rejected, and DAKSHA himself destroyed by thee; for such oblations as are made without faith in him, who is the giver of rewards in them, are productive only of evil.

* DAKSHA was the father-in-law of SHIVA.

प्रजानाथं नाथ प्रसभ मभिकं स्वां दुहितरं
गतं रोहिद्भूतां रिरमयिषु मृष्यस्य वपुषा ।
धनुष्पाणेर्यातं दिवमपि सपत्राकृत ममुं
त्रसन्तं तेऽद्यापि त्यजति न मृगव्याधरभसः ॥२२॥

When BRAHMA'* lusting after his own daughter (that had through fear of her father's attempt against her virtue transformed herself into a hind) became a stag, with a view to gratify his passion, thou didst bend thy bow against him; and when he had fled from thy fear, even into heaven, thy hands, like those of a chasing hunter, took him, and have not yet set him at liberty.

स्वलावण्याशंसाधृतधनुषमह्नाय तृणवत्
पुरः प्लुष्टं दृष्ट्वा पुरमथन पुष्पायुध मपि ।
यदि स्त्रैणं देवी यमनिरत देहार्द्धघटना
दवैति त्वा मद्धा वत वरद मुग्धायुवतयः ॥२३॥

If, O destroyer of TRIPURA, even after seeing the flower-armed† god of love reduced like grass instantly to ashes for audaciously hoping to overcome thee by making‡ PA'RVATI's beauty as his instrument, the goddess still looks upon thee as if thou wert subject to animal passions, because half of thy body is joined with hers, then, O thou self-controlling dispenser of blessings, young women must be deceived.

श्मशानेष्वा क्रीडाः स्मरहर पिशाचाः सहचरा
श्चिताभस्मालेपः स्रगपि नृकरोटीपरिकरः ।
अमङ्गल्यं शीलं तव भवतु नामैव मखिलं
तथापि स्मर्तॄणां वरद परमं मङ्गलमसि ॥२४॥

Although owing to thy sports in the cemetery, with the devils as thy followers—the ashes of the burnt pile as thy ointment—and skulls as thy necklaces and drinking cups—thy disposition and very name must appear evil and be awful—yet thou art the cause of supreme felicity to all that call upon thee.

* BRAHMA' is the first person of the Hindu Triad and the creator of the universe.

† KA'MADEVA, the god of love, or animal passions, is supposed to use flowers as his shafts when he strikes lust into the hearts of men.

‡ PA'RVATI was the wife of SHIVA.

मनः प्रत्यक्चित्ते सविधमवधायात्तमरुतः
प्रहृष्यद्रोमाणः प्रमदसलिलोत्सङ्गितदृशः ।
यदालोक्याह्लादं ह्रद इव निमज्यामृतमये
दधत्यन्तस्तत्त्वं किमपि यमिनस्तत्किल भवान् ॥२५॥

Thou art verily that incomprehensible truth which the self-controlled devotees contemplate when they put their fingers to their nostrils and fix their thoughts, abstracted from all external impressions, within their minds, and when through joy their hairs stand on end, and they, as if immersed in the sea of delight, feel themselves happy, plunged in the waters of immortality.

त्वमर्कस्त्वं सोमस्त्वमसि पवन स्त्वं हुतवहः
स्त्वमापस्त्वं व्योम त्वमु धरणि रात्मा त्वमितिच ।
परिच्छिन्नामेवं त्वयि परिणता विभ्रति गिरं
न विद्म स्तत्तत्त्वं वयमिह हि यत्त्वं न भवसि ॥२६॥

Thou art the sun—thou the moon—thou the air—thou thyself fire—thou art water—thou art sky—thou the earth—and thou the spirit. With such expressions did the ancients define thy essence. But as for ourselves, we acknowledge that we know no substance which thou pervadest not.

त्रयींतिस्रोवृत्ती स्त्रिभुवनमथो त्रीणपिसुरा-
नकाराद्यैर्वर्णैस्त्रिभिरभिदधत्तीर्णविकृति ।
तुरीयन्ते धाम ध्वनिभिरवरुन्धानमणुभिः
समस्तं व्यस्तं त्वां शरणद गृणात्योमिति पदं ॥२७॥

The mystical and immutible OM which being composed of the three letters A U M signify successively the three *Vedas* (*Rich, Yâjus* and *Saman*)—the three states of life (awaking, dreaming, sleeping)—the three worlds (heaven, earth, and hell)—the three gods (of the triad, BRAHMA', VISHNU, and MAHESHWARA)—and which by its nasal sound is indicative of thy fourth office as supreme lord of all—ever expresses and sets forth thy collective and single forms.

भवः सर्वो रुद्रः पशुपतिरथोग्रः सहमहां
स्तथा भीमेशानाविति यदभिधानाष्टकमिदं ।

अमुष्मिन् प्रत्येकं प्रविचरति देवश्रुतिरपि
प्रियायास्मै नाम्ने प्रणिहितनमस्योस्मि भवते ॥२८॥

BHAVA, SARVA, RUDRA, PASHUPATI, UGRA, MAHA'DHVA, BHI'MA, and I'SHA'NA, of these thy eight names, each, O god, is celebrated in the *Vedas* (or each the gods desire to hear.) With a humbled mind I bow and adore to thee who art called by these precious names.

नमो नेदिष्ठाय प्रियदव दविष्ठाय च नमो
नमः क्षोदिष्ठाय स्मरहर महिष्ठाय च नमः ।
नमो वर्हिष्ठाय त्रिनयन यविष्ठाय च नमो
नमः सर्व्वस्मै ते तदिदमतिसर्व्वाय च नमः ॥२९॥

Reverence to thee, O god of meditation and austerity, who art nearest (i. e. to those that serve thee), and who art also farthest (i. e. from them that disregard thee)—Reverence to thee who art the humblest (i. e. to those that are humble), and who art also the greatest (i. e. to those that are high-minded)—Reverence to thee who art old (as the creator of the universe), and yet young, being independent of the decaying effects of age—Reverence to thee who art all, and in whom all things subsist!

बहुलरजसे विश्वोत्पत्तौ भवाय नमोनमः
जनसुखकृते सत्त्वस्थित्यै मृडाय नमोनमः ।
प्रबलतमसे तत्संहारे हराय नमोनमः
प्रमहसि पदे निस्त्रैगुण्ये शिवाय नमोनमः ॥३०॥

Reverence, O Reverence, to BHAVA, who partakes chiefly of the *Rajas* quality for the creation of the world. Reverence, O Reverence, to MRIDA, who partakes of the *Sattva* quality for the conservation of the world and the happiness of men. Reverence, O Reverence, to HARA, who is principally moved by the quality of *Tamas* in the destruction of the world.

कृशपरिणतिचेतः क्लेशवश्यं क्वेदं
क्व च तव गुणसीमोल्लङ्घिनी शश्वदृद्धिः ।
इति चकित ममन्दीकृत्य मां भक्ति राधा
दरद चरणयोस्ते वाक्यपुष्पोपहारं ॥३१॥

How vast the difference between my understanding, capable of grasping only little objects and subject to the perturbations of the passions, and between thy everlasting glory, whose properties know no boundary!—Hence my faith having led me, who am fearful of thee, to this profitable exercise, casts me at thy feet with this verbal offering, as with that of flowers.

असितगिरिसमं स्यात् कज्जलं सिन्धुपात्रं
सुरतरुवरशाखालेखनी पत्र मुर्वी ।
लिखति यदि गृहीत्वा सारदा सर्वकालं
तदपि तव गुणानामीश पारं न याति ॥३२॥

O Lord, even if there were a heap of ink like a black mountain, were the ocean itself the inkstand, and did SARASWATI herself continue to write for ever with the twigs of the *Kalpataru** as her pens, having the earth itself for her paper, [*even if there were such a writer with such stationery, and to write for so long a time*] still would it be impossible to express the limits of thy qualities.

कुशुमदशननामा सर्वगन्धर्वराजः
शिशुशशधरमौले र्देवदेवस्य दासः ।
स्वगुरुनिजमहिम्नो भ्रष्टएवास्य रोषात्
स्तवनमिदमकार्षीद्दिव्यदिव्यं महिम्नः ॥३३॥

KUSHUMA DASHANA (PUSHPADANTA, or flower-teethed) the chief of all the *Gandharvas*, and the servant of the god of gods, who bears on his head the crescent of the moon, being in consequence of his wrath deprived of his greatness, composed this excellent hymn of the lord's glory.

सुरवरमभिपूज्य स्वर्गमोक्षैकहेतुं
पठति यदि मनुष्यः प्राञ्जलिर्नान्यचेता ।
व्रजति शिवसमीपं किन्नरैः स्तूयमानः
स्तवनमिदममोघं पुष्पदन्तप्रणीतं ॥३४॥

If a man, having worshipped the chief of gods, read with his hands closed together, and his attention fixed, this hymn, composed by PUSHPADANTA, and of certain efficacy as the one only means of emancipation in heaven, he will join the company of SHIVA, and will be adored by the *Kinnaras*.†

* A fabulous tree of mythological celebrity, which yields any fruits that are desired by any one.

† The *Kinnaras* were a species of celestial beings.

ART. III.—*Account of a Journey from Calcutta viâ Cuttack and Pooree to Sumbulpúr, and from thence to Mednipúr through the Forests of Orissa.* *By* LIEUT. M. KITTOE.

As the country west-south-west of Mednipúr, for upwards of four hundred miles through which the high road to Nagpúr and Bombay passes, is noted down even in the most improved maps as *terra incognita*, therefore, by most considered as such, a brief account of my recent travels in that direction may not be uninteresting.

I am unable, for many reasons, to give very minute details, first, in consequence of the hurried manner in which I had to travel; next, from the very inclement season during which I did so; and again, owing to the great reluctance which the natives of Orissa have to afford any information, and what is more, to their decided silence; it being (as I have always had occasion to remark) more than the life of an individual is worth were he to be detected by his chief in divulging the scanty resources of his country.

About the middle of April 1838, Captain G. Abbott having fallen an early victim to the deadly climate of the Keunjur and Mohurbhunj jungles, to the distracting knavery of the people he had to deal with, and the annoyance and exposure they caused him to suffer,* I was appointed to succeed him, and directed to proceed immediately to Sumbulpúr to take charge of the survey of the Mednipúr and Raepúr post road.

There then being no possibility of travelling by dawk by the post road with any degree of safety or comparative comfort at such a season, I resolved on proceeding viâ Cuttack and the valley of the Mahanuddí, through the Burmool pass and onwards by Boad and Sohnpúr, i. e. following the course of the river, as the surest means of obtaining the first necessary of life, viz. good water.

I left Calcutta for Cuttack by dawk on the evening of the 17th April, where I arrived on the morning of the fifth day. I travelled at night, and halted during the day at Mednipúr, Jullaisúr, Ballaisúr, and Bareepúr successively.

On reaching Cuttack I found so much difficulty in procuring bearers to take me to Burmool (where I expected a relay from Sumbulpúr) that I resolved on going on to Pooree, and from thence across the country to that place; but a set having at last agreed to go for something more than the usual travelling rates, I struck the bargain

* Captain Abbott commenced his travels early in January, 1838, was taken ill on the 22nd March near Keunjurgurh, and died two days after his arrival at Sumbulpúr on the 3d April following.

and sent them on to Badeswur, half way to Burmool. I went on to Pooree, where I remained three days, being completely overcome with the fatigue of so much dawk travelling, for it was but lately I had returned from my tour in Orissa in search of antiquities, coal, and minerals, &c. an account of which tour has already appeared in this Journal.

While at Pooree, I tried again to procure more coins, but having shewn too much anxiety, and paid too much for those I did get, on former occasions, the suspicions of the Brahmans and shroffs were excited, they would give no more, except a few sovereigns, shillings, six-pences, and some Goah coins, which from their inferior standard were unsaleable in such a market.

I did my utmost to procure facsimiles of the inscriptions in Juggernath temple, also of those in the Gondeechagurh, but was, as usual, unsuccessful.

The tide ebbing very low at that season of the year I was enabled to collect a great variety of marine shells, but few however were sufficiently perfect to be of any value, the violence of the surf destroying all the more delicate species.*

I left Pooree on the evening of the 26th, and reached Koordah early on the following morning. I took up my abode in a shady mango grove near the ruins of the old *Noor* or palace, in the vicinity of which are many modern temples all equally inelegant and unworthy of notice.

When at Koordah in the previous month of March, I was unable to visit the cave of PAUNCH PANDEB, therefore I determined to do my best on this occasion. About noon I proceeded on foot for a distance of a mile and a half, having to crawl in many places through the jungle thicket, and reached the foot of the ascent, which is by a broad path, at a spot where under some stately Bur and Peepul trees† I saw a very elegant image of SU'RYA, in his chariot with many horses, driven by ARUNA (his charioteer); I had no time to spare to enable me to make a drawing of it.

After ascending a steep path for a quarter of a mile, I found myself in a beautiful glen, in its centre is a small and rudely built temple through which flows a beautiful spring of fresh water; I was told that there is an idol of PARBUTTI' within, carved in the rock, from the navel of which the water flows, however I did not think it worth the trouble of examining, being more interested in the *Pandeb Gurha*.

* All that were of any use were presented to the Society, and have been placed in the cabinets.

† *Ficus Indicus* and *Ficus Religiosa*.

Having therefore refreshed myself with a copious draught from the crystal stream, I continued the steep ascent until I reached the top of the hill, I had then to descend some way on the steep southern face; when I reached the cave I was sadly disappointed, for it was a mere cleft in the rock, with "*asthans*" or seats for ascetics cut within the cavity; I had hoped to find some valuable inscriptions, but there were none, excepting a few short sentences, and the names of ascetics in various characters, from the old *Kutila* of the 13th century to modern *Ooreya* and *Devanagri*, which I did not think worth transcribing; I deemed it better to take rest in the cool cave, and recover if possible from the effects of my long walk under a burning sun, at the hottest season of the year, so that after admiring the beautiful and extensive view which the spot commanded of the sea and the intervening woody plains, I laid myself down to sleep for a couple of hours, which completely restored me; I then returned to my palkee, and resumed my trip towards Badeswur, passing near the hot springs of Atteiree.

As I left early in the evening I had time enough to see much of the country, which undulates considerably, and is thickly studded with trees and underwood. There is a gradual fall towards the Mahanuddí; from Pooree to the vicinity of the Koorda hills the country is exceedingly low and flat, but it then has a gentle rise, caused by that curious ironstone formation occurring every where at the foot of the hills of Orissa.

The hill of Koorda is a rock which has been pronounced to be sandstone, but I am by no means satisfied of this being correct; it contains large proportions of lithomarge and quartz, it does not occur stratified, but chiefly in irregular and disturbed masses, the interstices are occupied with a coarse red loam resembling brick dust; the stone is variegated and speckled, and in some parts of its texture resembles pumice stone, or brick kiln slag; it is with this that most of the temples of Orissa are built, for from its softness it is easily worked, besides which it possesses a quality rendering it very desirable in the estimation of the natives—its predominant color being red.

From the high ground (before reaching Atteiree) the numerous conical and isolated hills rising abruptly from the vast level plains present a very singular and striking appearance. That of Bankee, called *Mahapurbut*, is the most conspicuous; they would all appear to be of volcanic origin. I reached Badeswur at about 2 A. M., and continued my journey with my Cuttack bearers twenty-three miles further to Bailpara, where I put up in a mango grove during the heat of the day.

Had I reached Badeswur at daylight, I should most probably have remained for the day, as there are several pieces of sculpture worth drawing; there is also an ancient temple on a rock in the Mahanuddí, which I was unable to examine on my former visit in 1836-37 in consequence of the river not being then fordable; an account of what I then saw is to be found at page 828, vol. vii, (second part) of the Journal of the Asiatic Society, where there is also a sketch of one of the temples; accompanying is a drawing of an elegantly executed image of PARBUTTI, at the same place, which I made on that occasion; like most of the more elegant and ancient idols, it is of black chlorite, and well polished.

On arriving at Bailpara I found my escort and other persons whom I had sent on to accompany me from Burmool onwards by water, but the river being more than usually shallow, I was compelled to abandon the intention.

I continued my journey early in the evening, that I might be able, if possible, to visit some caves said to be near a small temple on the high conical granite hills called *Mooní Budra*, about six miles beyond Bailpara, but on reaching the hills I found myself too much fatigued to warrant my running (perhaps) a wild goose chase after them, such as I was led to do, when at Balaisúr, to the *Nilgurh* hills; I therefore passed on, reaching Burmool about 9 P. M. and found to my sorrow that the Dangur bearers, who had been kindly sent for me from Sumbulpúr by Mr. C. L. Babington, after waiting three days had that very morning left to return homewards, and to "mend" matters, my Cuttack men refused to proceed. With the pleasant prospect of having to wait two or three days in this wild place, with no other shelter than was afforded by the shady forest trees and my palkee, also a very scanty supply of eatables, I fell asleep, having however previously sent on a couple of village Paiks to try and overtake the bearers and bring them back.

The following morning my guard having arrived and procured me some milk and eggs, I selected a shady spot on the immediate bank of the river, at the entrance of the pass, where I placed my palkee, from which I had a fine view of the river and the valley. Where there is no remedy, there is little use in fretting, so I determined to make the most of a bad job, and covered the palkee with green boughs to render it as cool as possible, it kept the temperature down to 98°. I took a walk along the banks and succeeded in shooting a number of fine mullet, which this river is famous for. I set to work to cook some of them, my chillumchee serving as a frying pan, and a village handee for a boiler. I made a good

meal and fell asleep. On waking, I found myself in better luck than I had expected, the Paiks having returned with fifteen of the twenty Dangurs who had left, as I before stated. I immediately proceeded, and reached the top of the pass about 8 P. M., resting for awhile at Puddum talawo, on the spot where I had encamped when with my regiment in June, 1837, I then continued my journey as far as the Bunjara halting place, near Gussungurh, in the Boad country, which I reached at midnight. At day-break I left the high road and went to the river side at a village called Korasingha; I made my palkee as snug as possible for the day. A very fine Mahaseer was caught and brought to me by a fisherman, so that I had no fear of starving.

The village was almost entirely deserted, which I was informed is the case for many miles from the Burmool pass (which is the boundary between the estates of Boad and Duspalla) to within a few miles of the town of Boad. The whole country has been almost laid waste since 1836; the Raja's followers lay the blame to the Kunds and their chief Nuncumkonwur, who inhabit the mountains running parallel with the river as far as Sohnpúr, at an average distance of four miles, and then recede in a southerly direction towards Gilleirí in Gúmsúr; the ryots, on the other hand, attribute the impoverished state of the country to the tyranny and misrule of the Boad Raja, and further assert that the Kunds were driven to aggression by his treachery and injustice.

I passed the day as well as the heat (at 115° with a fierce hot west wind) would permit of; I had not felt such since my quitting the North-western Provinces; it was an unpleasant contrast to the cool (south) sea-breeze prevailing on the other side of the mountains.

I resumed my travels in the early part of the evening, and reached Rumbagurh about 10 P. M. where I halted for several hours to allow the bearers rest; it is a miserable place, with indifferent mud walls and watch towers, but is deemed a *gurh*, or stronghold.

About 2 A. M. I continued my trip, intending to put up at Boad, but it being very late before I reached a small village two miles nearer, I thought it best to avail myself of the fine shelter afforded by a mango grove on the river side.

I suffered a great deal during the night from feverish symptoms, the effects of exposure, and so sudden a change of climate; I had little or no sleep, so that I had an opportunity of observing the country in the immediate vicinity of the road. There is much waste land, which appears to have been lately under cultivation, yet there is a far greater proportion of jungle and forest, having the same features as that of

other parts of Orissa. The stratum of soil is generally very thin, the gneiss and granite rocks protrude through it in all directions, in some places rising into small hillocks, in others, appearing in continuous and gently undulating pavements (as it were) for considerable extents. I neither saw nor heard bird nor beast, except the shrill and disagreeable note of a large species of *Caprimulgus*, which swarms throughout the forests. I was sadly annoyed during the day time, with the incessant, and distracting noise of an insect called "*jhinkare,*" (the *chicādā ?*)

The Mahanuddí at Korasingha was broad, with a sandy bed; at this place it is divided by numerous small islands, thickly wooded, the bed is rocky throughout; the navigation during the rains must be very dangerous. The rocks are apparently granite, and present a very curious appearance, for in many places the different kinds of which granite is composed are to be seen in serpentine strata distinct from each other, the talc adhering to the quartz and felspar in large masses—all the rocks are more or less in a decomposed state; garnet crystals are common, and very beautiful; garnets of a small size are found in the sand; of a number I had collected on a former occasion near Cuttack, some were pronounced by a native jeweller to be rubies. I was informed that poor people gain a livelihood by seeking for gems, and that rubies of some weight are occasionally found; the purchasers prove them by heating them to a red heat, and if when cooled they have retained their color, they are valued accordingly.

The thermometer this day did not rise above 110°, I consequently had some little rest, and continued my journey early in the evening, reaching Boad before sunset. I was detained some time on account of the guides not coming; this was designed on the part of the Raja, who is very uncourteous to any Europeans from whom he may have no chance of gaining anything; I had sent to him in the morning to announce my arrival near his capital, but he did not even deign to send an answer or a single Paik to attend upon me; his conduct was very different when our troops were parading the country the previous year. The impudence and haughtiness of these semi-barbarians is proverbial; they were treated with much less ceremony by their Marhatta rulers than by the British Government; forbearance on our part is considered weakness by them, but at the slightest shew of resentment they are ready to cringe at your feet. I had to wait upwards of half an hour, during which period I was pestered with complaints from oppressed ryots and *bunjara* merchants. Among the latter was an old man who had been in camp with us in 1836-37, to beg of the Commissioner to espouse his cause, and make the Raja, and Nuncumkonwur (the Kund

chief) restore his cattle and the value of his merchandize, which had been plundered from him near Gussungurh in 1835.

I made particular inquiries touching the practice of human sacrifice since we had rescued all their *Merriahs*;* I was assured that there had been no "*Merria pooja*" this year, but I have reason to doubt the truth of the assertion.

On my way out of Boad I remarked several old temples on which, as I have been since informed, are inscriptions; had I known of this at the time, I should certainly have stopped and transcribed them.

My bearers having informed me that there was a bye-path across country, by which eight or ten miles would be saved, I preferred going by it to following the course of the river viâ Sohnpúr to Sumbulpúr along the right bank; therefore upon reaching a large village called Sūgliah, I crossed over, and resting for a couple of hours travelled on till 7 A. M. and encamped in a miserable mango tope by a village called Mirlipullí, the Zemindar of which would neither come to me nor afford supplies, till at last the Dangurs got hold of him and brought him to me, begging I would keep him in durance until his Paiks should have brought what little was required. I had been obliged to leave my escort to follow after me, so that I was nearly helpless, I however followed the advice of the Dangurs and kept the fellow by me till every thing was forthcoming, and subsequently paid for.

This part of the Sohnpúr territory appears tolerably fertile, the country is undulating and rocky, but the water is very near the surface; there are numerous small wells about the villages, the water of which is drained by the *Dhankuli*, or tilt-pole. The soil has a very curious appearance from the great quantities of snow-white quartz and talcite; I picked up some fine specimens of talc by the mouth of a well; the people told me that it is to be found in very large pieces at some depth below the surface.

I experienced another hot day. Having to travel over some bad ground, I resumed my march at an early hour, and reached a large village at 10 P. M. I rested several hours, and then went on to Keuntapullí, a short distance before reaching which, I had to cross a tolerably steep ghat over the chain of low hills, which commencing near Sumbulpúr, run for many miles nearly due north and south, parallel to the river, and no great distance from it.

I encamped as usual under some fine tamarind trees by the river side. Having reached my ground at an early hour, I had plenty of time to look about me. The river for upwards of a mile is ex-

* Children intended for sacrifice.

ceedingly still and deep, it being confined between a line of rocks the strata of which incline at an angle of 45° and have a most singular appearance. The village is chiefly inhabited by fishermen, as its name implies, "*Keunta*" or "*Kewat*" meaning "fisherman," and "*pullí*" a "village," anglice, the "fisherman's hamlet." The Keunts of this place appear to be a very idle race, they angle all day and cast nets and spear fish at night. This latter operation is performed by the following means—one or more torches are burnt at the stem of a canoe, where a man stands waiting with spear or grange in hand, the canoe is either pushed or paddled along with the least possible noise by a boy at the stern, the fish are attracted by the glare of the torches, swim about near the surface, and become an easy prey to the expertness with which the grange is handled.

During those months in which the river is navigable, the Keunts have ample employment in transporting merchandize to and from Sumbulpúr, Kontillú, and Cuttack.

There is nothing remarkable in the appearance of the country about Keuntapullí; on the right bank there is much low jungle and a few small hills at some distance; on the left, the range of hills before mentioned are about a mile distant, the land intervening having a gradual slope towards the river; there is much more jungle than cultivation, for there are numerous water-courses and ravines intersecting it.

I resumed my march an hour before sunset, and reached Dhama about 9 P. M. I did not stop, having met a relay of bearers who had been sent out from Sumbulpúr, which place I reached at 3 A. M. the next morning, the 4th May, none the better for such constant fatigue and severe exposure, however I considered myself fortunate in having done so well.

I remained at Sumbulpúr until the 23rd of the month, for I was unable to carry on the survey in consequence of the sickly state of the establishment, every follower of the late Capt. Abbott having suffered more or less from the deadly climate of Keunjur; his Bengallee writer, a sepahee, and another servant, died, shortly after their arrival at Sumbulpúr; there were several others in a dangerous state who subsequently died on their way home. From this I learnt a lesson for my future guidance, not to employ more Up-country servants than could possibly be avoided; it is absolutely necessary to have a few trustworthy men to serve as a check upon the Ooreya portion, who, if not closely looked after, would lend themselves to the roguery and schemes of their kindred.

The town Sumbulpúr is thrice the size of any I have seen in any of the other states; it extends for upwards of two miles along the proper

left bank of the river of this space; the fort occupies about three-quarters of a mile. It is fast falling to ruin; the Raja no longer resides in the old *Noor*, (citadel, palace) which is occupied by some of his officers; there is a miserable garrison of a few ragamuffins dressed as sepahees, and some twenty or thirty suwars whose steeds are like Pharaoh's lean kind. The walls are in a very dilapidated state, having suffered much from the effects of the extraordinary flood in 1836. The bamboo thicket, which was cut down during the time the territory was in our possession, used to act as a breakwater, and protected the walls, which are very ill-constructed of unhewn stones. The ditch and swamp which defended the other three faces are in a great measure filled up and overgrown with weeds, and must render that quarter of the town very unhealthy. There are many good dwelling houses of one and two stories, built of stone; there are also many temples, but few of them have any pretensions to elegance, and the generality are covered with most obscene figures badly executed.

There is no appearance of any great trade being carried on, nor is there so much as the sight of such a large and populous place would lead you to suppose. Merchants concentrate here from Cuttack, Buddruc, Nagpúr, Bhopal, Chutteesgurh, and Sirgoojah, and barter their goods; those of the lower provinces bringing salt, cocoanuts, cotton cloths, spices, brass utensils, &c. exchange the same with those of the central for wheat, gram, lac, and cotton; gold in small lumps is also taken in payment, and occasionally diamonds. The only produce of the province exported, consists of oil seeds, cotton, and rice, which are taken by bullocks, and (during the rains) sent by water to the Mogulbundí of Orissa.

Sumbulpúr has always been famous for its gold and diamonds; as far back as 1766 a Mr. Motte was sent expressly by Lord Clive to open a trade in them, and to explore the mines, but was unsuccessful on account of the disturbed state of the country, and the inclemency of the season, he having arrived there in the rains; two other Europeans who accompanied him died of fever, and he was himself nigh losing his life. An account of his expedition is to be found in the 1st Vol. of the Asiatic Annual Register, p. 50, published in 1800. The perusal of this narrative would amply repay the reader for his trouble.

The people of the country are too apathetic and indolent to attempt to work the mines, or rather to seek for them; for the diamonds are at present obtained by washing the red earth (their matrix) which is brought down by the Heebe-nuddí, and empties itself into the Mahanuddí, some miles above Sumbulpúr, from the mountains to the north-east,

in which there are most probably inexhaustible mines of gems and precious metals; gold is found in many of the streams flowing from the gneiss rocks throughout these tracts, the Heebe among the rest.

Touching the state of Sumbulpúr, it was (previous to its dismemberment by the Marhatta hordes and its becoming subject to Berar) subdivided into eighteen "gurhs," or chieftainships, held in fief of the Lord Paramount, who resided at Sumbulpúr, and called therefore "*Authareh gurh Sumbulpúr*"; amongst these were, Boad, Sohnpúr, Gangpúr, Oodeypúr, Phooljur, Sarengurh, Sarinda, Banaie, Baumurra, Lehrapal, Rerhakhōl, and seven others, including Sumbulpúr proper; most of these however have long since thrown off their allegiance and ceased to pay tribute or to furnish their quota of "Paiks" (militia). Some of the smaller "gurhs" used to be held on very curious tenures, which I shall allude to more particularly in a future page.

Sumbulpúr lapsed to the British Government in 1827 by the death of the late Raja, but for some reason (with which I am not acquainted) they sought for an heir-at-law and conferred it on an obscure and aged Zemindar, and a perfect imbecile, who is now entirely in the hands of his crafty ministers. These people and the Brahmins possess the best lands, and obtain his sanction to all kinds of extortion; as a specimen of which, I am informed that *Zemindarí* leases are renewed every year, and on these renewals, or on the occasions of lands being transferred to another, the party favored has to give a "*Salamí*" or fee, and nothing short of gold is accepted; the farmers in their turn grind their ryots; the effects of such an unjust and oppressive system are every where apparent.

It is said that the Raja realizes 7,00,000 Rupees per annum, but 4,00,000 is perhaps nearer the mark, including valuable diamonds which are occasionally found; it is certain that were the province under proper rule, much more could be made of it, therefore it is to be hoped that on the demise of the present Raja, who has no children, the Government will avail itself of the opportunity and resume it; at present it pays us an annual tribute of 8,000 Rupees, 500 of which has for some years past been remitted in consideration of the dawk road being kept in repair, and the jungle in its immediate vicinity cleared.

I was somewhat surprised one morning while taking my ride to see three human heads stuck on a pole at the junction of two roads near the town; they were placed there in January, 1838, their owners having forfeited them for treason, though not without a protracted and severe struggle.

There are no antiquities at this place save a few fragments from the ruins of a Budhist temple, some thirty or forty miles up the river, which were brought some years ago for building purposes. I was told that there was an inscription on a rock in the middle of the river about a mile above the town; I went one morning to examine it, and found merely a few brief sentences and the name of a *Byragí* who had died there some few years ago. The spot is held sacred on account of the evil deity supposed to preside over the river, which is evidently very deep, being confined in a long narrow basin formed by the gneiss rocks which stretch across it in all directions. Some years back the Marhattas in attempting to carry away a heavy brass gun on a raft, it sank and every soul perished; the credulous inhabitants believe that the demon appeared on this occasion, and dragged them all into a fathomless abyss which is said to exist there.

During my stay at Sumbulpúr I endeavoured to collect as much information regarding the country lying between it and Mednipúr as I could; this was no easy matter, for the accounts I received were so contradictory that I determined at all hazards to explore the country, following the direction of Mednipúr as nearly as possible and keeping south of the old road. Every argument and persuasion were made by the Raja and his ministers to dissuade me; all kinds of dangers and difficulties were pictured to me, which failed in their intent, for I could plainly see that there was some object in view. Amongst the persons who exerted themselves most to deceive and dissuade me was an individual whom Major W———— (the Governor General's Agent for the South-western frontier) had sent with a view to his assisting my unfortunate predecessor, which he was capable of doing from his knowledge of the country; his anxiety was perhaps attributable more to a desire to prevent my hearing of the tricks he had been playing in the Baumurra district when awaiting his arrival, than to any other cause.

During my stay here I had searched for a good spot for erecting a bridge over the Mahanuddí, (if such a great work were ever undertaken) which I found very near the present ford and ferry; the river is there 4,500 feet broad in the rains, and there are huge masses of rock at convenient intervals right across, which would afford excellent foundations for either wooden frames or masonry to support a wire or an iron suspension bridge; I found the highest flood water mark to be about 47 feet above the level of the shallow stream flowing during dry seasons in the centre of the bed.

Before taking my final departure from Sumbulpúr, I made an outline sketch of the hills, which are distant at their nearest point fourteen miles, extending from Baumunsassun, about north-west, till they

vanish in the horizon to the south-east in the direction of Ungool; in this range, (the highest peaks of which are perhaps 1000 feet) there are several ghats, which was readily admitted. That of Baumunsassun, near which the present road passes, is the first, next to it is one called Kurorumma, then Oorsing, all north of the proper direction of Mednipúr, lastly the ghat of Burrorumma about eight or ten miles further south; it was by this latter (which had been visited by one of Mr. Babington's people) that I determined on proceeding.

My first march from Sumbulpúr was to a large village called Bahum, having many fine mango topes and good cultivation, chiefly sugar cane; the fields are irrigated from a large nulla called Maltaijoor, which rising in the adjacent hills empties itself into the Mahanuddí at Munesswur, a village about three miles below Sumbulpúr; its course through the plains (from the foot of the Burrorumma range to the Mahanuddí) is very circuitous, it is navigable during the heavy floods, but dry for the greater part of the year, except that a plentiful supply of excellent water is always to be obtained by digging in the sand.

The distance travelled this stage was eleven miles and three-quarters measured by the Perambulator, but it is certainly no more than eight as the crow flies, for on leaving Sumbulpúr, I was led for upwards of a mile in a direction at right angles to that I had ultimately to reach; I was then led considerably to the southward ere I gained the proper course. Such an account may excite surprise in the minds of those who have not visited these regions of knaves and savages, but so it is in reality.

Several small villages were passed a little to the right and left of the road; there is a good portion of arable and clear land in the vicinity of each, particularly of those nearer Sumbulpúr. One small village close to which the road passed, particularly attracted my attention, the huts being built on the bare white granite rocks, which have the appearance of so many terraces; on one of them I observed veins of quartz about an inch wide crossing each other at right angles, resembling a large cross—close to this was another curiosity in the shape of a Goolur tree (*Ficus glomerata,*) growing on the bare rock, on which the roots were spread and interwoven in a most curious manner; the main root appears to be sunk in a narrow fissure beneath the trunk: it has a most singular appearance. There is not much jungle except on the rocky and unfavourable spots, and the only large trees I saw were on a small hillock about one-third of the way, beside the village of Durriapullí, from whence to an elevated spot where there are rocks of micaceous schist the country has a perceptible rise, and undulates

considerably; from thence to Bahum it inclines towards the Multaie;* the soil is firm, being a stiff sandy clay with much decomposed quartz, granite, and talcite, of which very beautiful specimens occur.

Notwithstanding the sky being overcast, the heat was very great; the thermometer in a tent exposed to the occasional sunshine, rose to 115°, but with tatties and under a shady tope we managed to keep the temperature down to 98°. I say *we*, for Mr. Babington and his assistant, Mr. Martin, having resolved on accompanying me as far as Burorumma, had sent on tents. My camp equipage consisted simply of a palkee and a couple of settringies,† one to spread, and the other to hang over a bough to serve as an awning for the purpose of screening me from the scorching sun. I had a small pony on which I rode occasionally to relieve myself and the bearers, also one Mussulman servant to cook for me, I had an escort of a havildar's party from the Ramgurh L. I. Bat^n. which I found of much use, I had also a Naik's party from the 19th N. I. which had accompanied me from Cuttack, and it was well I mustered so strong a party, as will be seen hereafter.

In the evening I sketched a rough outline of the Hills, in which at some distance north of the ghat I was to proceed by; I perceived a wide gap or break through which I was most positively assured by all the Raja's people that there was no pass. I had taken the bearing of this identical spot on a former occasion when it was pointed out to me as the Burorumma pass, so that I was convinced that further attempts were being made to deceive me; this made me the more determined to have my own way, which was best to be effected alone, so I took leave of my companions, persuading them to return; for although I cared but little for the exposure and privations I saw clearly that I should have to undergo, yet I did not wish to subject them to any. The next morning, the 24th May, I marched at an early hour, crossing the Maltai, north, half a mile from camp; for several miles I travelled through alternate woody and cultivated tracts, by an excellent broad path, in the direction of the gap before mentioned. I began to hope that it was the real ghat, and its appearance warranted the expectation that it was a very trifling one, but I was soon undeceived, the guide stopped short, for there was a tree felled and thrown across the path—the usual hint laid for a guide to lead the traveller from the

* The Multaie-joor "*joor*" is an affix to the proper name *Multaie*, meaning a nulla or torrent; for instance, Dhoba-joor, Bur-joor, Bramunf-joor, &c. *Khai* and *Naul* are likewise affixes, having the same meaning, such as Khor-khaf, Seam-khaf, Rama-naul, Kussum-naul, &c. &c.

† Cotton carpets.

direct road. Upon questioning him, I received the usual evasive replies of "that is not a high road, it merely leads into the forest;" and "what do I know; I live at Bahum;" "I have not seen, &c. &c." I took the knave aback by asking him the name of the ghat I was going to, and insisting that that was it, pointing to the gap. Forgetting himself, he replied that that was the Baghloth ghat; he then admitted that the road led direct to it. I was obliged to strike off to the right, and travel for some miles along a narrow and winding path through a heavy Saul forest to the foot of the ghat, which is about a mile from a large village called Kundeswurí, belonging to Chundro Bearer, a Kund chief who holds the adjacent hill lands (more by might than right) from the Baumurra Raja; this man has a few followers, who, united in one interest, set all the neighbouring Zemindars at defiance, and make frequent plundering excursions into the plains; he is much dreaded by all. The Kunds are however industrious, and if treated kindly, peaceable; but such is the dislike the Ooreyas entertain towards them, and the consequent annoyances and tyranny they exercise over them when they perchance fall into their power, that they are obliged to retaliate in self-defence; this is the case throughout the tributary mehauls in which there are Kund villages.

The Kunds of these hills have no turmeric cultivation, nor do they perform the horrid *Merria pooja*, which is in a manner connected with it.

The ascent of the ghat is by a narrow glen between two ridges of hills, those to the right being very lofty quartzose rocks; it is at first very gradual and easy, but higher up becomes very steep, continuing so as far as the summit, the whole distance being a little more than three-quarters of a mile. The road is difficult on account of the loose stones of all sizes which are strewed about; there were remains of fences and other contrivances for defending the pass, which had been constructed the previous year, during some disputes with the Sumbulpúr Raja, who summoned all his vassals to assist him, but the Kunds had the best of it, as is generally the case.

There is a fine view to be had here of the Sumbulpúr plains, but owing to the haziness of the atmosphere I was unable to see any objects distinctly enough to take their bearings, except the high peak at the north-western extremity of the range of hills; following the course of the Mahanuddí, distant six miles south-east of Sumbulpúr, it bears 70° south-west; the soil at the top of the ghat is a hard red loam with much quartz, gneiss, and hornblende. I here remarked two heaps of stones each at the foot of a tree, which reminded me of the tu-

muli the ancient Britons in the north of England used to construct over the graves of fallen warriors, on which each traveller used in olden times to throw a stone on passing by; upon inquiry I found that these were of the same nature, the like practice existing. Those which I allude to, are over the remains of two chiefs who fell in battle on the spot. I had often remarked similar tumuli in the Kund districts, also in other parts of India, for it is in some places customary to heap stones or bricks on spots where persons have been killed by wild beasts.

Two miles and a half beyond the ghat I reached my encamping ground, at the village of Burorumma. There is a gradual fall the whole way; the path is through a thin forest of large Saul and other timber trees with no underwood. Much ground has been lately cleared in the vicinity of the village which is situated at the head of a large valley extending for many miles in a south-easterly direction at the back of the range of hills before described; there are many fine mango, tamarind, jaumun, date, and other trees around the village; it is nearly depopulated owing to the misrule of the chief (Chundro Bearer); the sepahees and peada whom I had sent some days previously to prepare for me, had been nearly starved, the chief having forbidden supplies; a little firewood and some milk were however brought to me. I rigged out a shed with my carpets, palkee, &c. under the trees near the village, and hoped to have passed a tolerably pleasant day, but as soon as the sun got high myriads of small insects (?), descended from the trees and rendered it impossible for me to remain, for in addition to the discomfort their presence occasioned, their bite was painful: I was compelled to seek refuge in a ruined hut in which the thermometer stood at 106° 2′.

Shortly after my arrival I was visited by Chundro Bearer's eldest son, who came with a number of retainers armed with swords, matchlocks, and bows. He is rather a fine young man; he made many apologies for the supplies not being ready, and shortly sent us what was required. The retainers did not seem inclined to be over civil, several of them were intoxicated, one fellow in particular, who came just after the remainder had left, threw himself down close to my carpet and began raving, and from what he said, it was evident that they would have been glad to have found out what persons had recommended me to come by this route, and most likely have taken some means of revenge. To add to the discomfort of my camp followers, the people most effectually concealed the well or spring which supplied the village with excellent water; they were compelled to help themselves from a small well which did not afford more than a lotah full of bad water every four or five minutes.

Being anxious to push on, and get out of this inhospitable track, I packed up and resumed my march at 6 P. M.; as long as it was day-light we got on tolerably well, although the road had been obstructed for miles together with trees felled and thrown across, but as soon as the evening closed, our troubles commenced; the heat was oppressive beyond measure, and not a drop of water was to be found to quench the tormenting thirst my followers were suffering from; we had been led to expect some from the bed of a large torrent two coss distant from our camp, but upon reaching it, the guide and coolies all denied there being any. A poor coolie was taken to task by one of the Kunds for offering to point out where it was. I would have resented this in the most summary manner, but I knew that we were completely at their mercy, for they had taken us off the road, and were leading us over a most rugged path, and whenever chance led us on to the high road, (which was a very excellent one), they halted, and pretended they had lost their way; then after hunting for some time, led us again into the villainous track by which, after five and a half hours' toil we reached Jaumunkeera. This is a large village in the centre of the valley, which is here open and well cultivated; the distance was nine miles and three quarters, and by the better one which the Moonshee followed, only eight and a half. We rested in a paddy field near the village till 4 o'clock the next morning (25th May) at which hour I attempted to move onwards, but the Kunds tried to detain me, refusing to allow the Burorumma coolies to go on with us, or to get others that day in their room. I would not be trifled with, and commenced my march. Their next step was to deny any knowledge of the road; it then became high time to put a stop to this insolence; I brought the ring-leaders to their senses with the help of the "argumentum bacculinum," a road was pointed out, and a relief of coolies arrived forthwith. I had proceeded about two miles, when I discovered that the guides were playing me the same game that those had done on the previous night; I met a Paun* who was just returning from the very place I was proceeding to, so I promised him a reward, and took him with me. He soon led me on to a good, and much frequented road to Burghat, the spot where supplies had been collected for me by the Baumurra people, and which I reached at 11 A. M. much fatigued, having travelled eleven miles. I took shelter in a hut that had been prepared for me by the sepahees, of green boughs, on the edge of the Burghat nulla; in this I passed the day with comparative comfort; some of my people, however, suffered very severely from thirst and exposure to the sun.

* A person of low caste; they make the best guides, for being given to make plundering excursions, they are acquainted with every nook and corner.

The country through which I travelled this day is open, with evident traces of having been in a much more prosperous condition at no distant period. There are extensive pasture lands, and large herds are brought from long distances to graze, the herdsmen living in temporary huts, and having enclosures annexed to protect the cattle from wild beasts. I observed many traces of recent cultivation, and occasionally fields freshly ploughed, although I could not discover a single village the whole way, I was also assured that there were none; I am, however, convinced that there are many at no very great distance, hidden by the intervening jungle, beyond which I could see clumps of mangoes, tamarind, date, and tarri trees, which latter seldom occur except in the vicinity of habitations. I felt moreover convinced that there must be other roads up this fine table land than that by which I came. On inquiring of the Baumurra people, and of some bunjarahs I had met on my way, I found that my surmises were correct, not only in this particular, but as to the Baghloth ghat, which, as I have before stated, had been kept a secret from me. I determined to satisfy myself of these points by directing the guard of regular sepahees to return by the other path and by the ghat; I sent them the next day from Deogurh, and I subsequently received a report from the Naick of the guard who stated that he had passed through many villages with abundance of water, and that the ghat was perfectly easy, with an excellent path; the very reverse of what the knaves of guides had told me. There is no habitation any where near Burghat, which is merely a pass (as the name implies*) leading from the high land before described, down to the less elevated tracts of Baumurra, all inclining towards the Brahmení river, into which all the torrents (that of Burghat among the rest) empty themselves.

My people were too much fatigued to allow of my resuming my march that evening, so we lighted numerous bonfires round the camp to keep off wild beasts, and passed the night where we were.

(To be continued.)

* "*Ghat*" or "*Ghatti*" means a pass, they are affixed to proper names, such as "Kend-ghatti" the Kend (or ebony tree) pass; "Sher-ghatti" the Tiger pass; "Kussum-ghat" the Kussum (tree) pass; "Burghat" the Bur (tree) pass, &c. &c.

ART. IV.—*Proposed publication of Plates of Hindu Architectural Remains.*

To the Secretary of the Asiatic Society.

SIR,—In the sixth volume of the Journal of the Asiatic Society, page 453, in an article from the able pen of our late Secretary, touching the sculpture at *Sanchi* near *Bhilsa*, he expresses his opinion that it would be of advantage to publish a series of Hindu Architectural Remains,* and I am aware wished to introduce the subject in the Journal, but the difficulty and expense attending the preparation of plates, requiring even little labor, prevented his doing so. Latterly, at his request, I prepared several lithographs representing different pieces of sculpture which I collected during my different tours in Orissa; having many more in my portfolio which might prove interesting to some of your readers, I propose (should you be of this opinion, and it meet with your approval) to publish occasionally one or two plates, with such explanatory notes as I may be able to give.†

In the present number I have given a drawing of an elegant piece of sculpture which I copied at Badeswur, in the valley of the Mahanuddí, and which I have alluded to at page 370.

This image represents the goddess DURGA as PARVATTI', wife of MAHADEVA (SIVA), and daughter of the Hymalya mountain in the *Parvatti Avatar*.

The figure, though mutilated, shews that the different emblems named were originally present. In one of her right hands she holds the *Nag-phans*, or serpent noose; the other (which is broken off) she holds up in assurance of no evil intention, it is called अभय "*a-bhai*," which means "without fear," or "fear not;" in one of her left hands was the *Unhoos* (elephant goad), part of the staff of which still remains on the arch; in her second she held the *Pudma*, or lotus, by the stem, part of which is destroyed;—I speak positively on this head, having seen many images of the same form in which the different parts wanting in this example were present excepting the *a-bhai*.

This deity is (like most others) presented as standing on an expanded lotus, with the *Singha*, or lion, and the *Vahun*, or vehicle of SIVA, at her feet.

* "It would be well worthy of the Asiatic Society to publish from time to time in England a volume of Hindu Architectural Remains from the materials in its possession; to this reference could always be made, and those who regarded only the works of Art, would find a volume to their taste, kept distinct (like the Physical Volume,) from the graver subjects of the Society's Researches."

† We most gratefully accept Lieut. Kittoe's proposal.—EDS.

The four female figures holding the emblems of the *Nag* (hooded serpent) the *Pudma* (lotus), the *Gadha* (mace), and the *Trisool*, (trident), represent *Sakhis*, or attendants. The two upper figures represented as flying with cornucopiæ and wreaths in their hands, are probably intended for bearers of offerings, and called *Powrí*, but have no other purpose or meaning than for ornament to the entire piece of sculpture; such additions were entirely at the discretion of the sculptor.

The idol is about three by one-half feet (every part inclusive,) and is worked in black chlorite; it is exceedingly well executed, the jewels and the embroidery on the drapery are most exquisitely cut, and the *tout ensemble* may be pronounced a beautiful specimen of Hindú sculpture.

M. KITTOE.

Art. V.—*Papers relative to the New Coal Field of Tenasserim.*

No. 1.—Report on the Coal Field at Ta-thay-yna, on the Tenasserim river, in Mergui province. By J. W. Helfer, M. D.

Locality.

This newly discovered coal field is a part of that great coal deposit which occupies a considerable part of the Tenasserim district, in Mergui province, and which beginning from the old town of Tenasserim, to judge from geognostic appearances, extends about forty miles to the north, about fifty towards the south-east, and to an unknown extent towards the north-east.

Face of the country.

All this tract of country seems to be a great basin encircled by primitive, but much more transition, formations, which in isolated ranges emerge also in different parts of this basin, but which are easily traced and recognized as the offsets of their more distant relations.

The present coal field lies at the southern skirt of one of these transition ranges, and the country to the south of it is apparently a great plain, densely covered either with tall forests or bamboo jungle; the Tenasserim river winds through this plain in a direction chiefly from north to south.

Geognostic features.

In the neighborhood of the present locality no geognostic signs of the existence of a coal bed are to be observed on the river side, save opposite to the village there is a large lump of a formation holding the medium between red sandstone, variegated sandstone, and slate clay—in this country a certain prognostication of the vicinity of coals. The river banks shew besides sandstone, conglomerate, plastic clay, marl, and alluvium; the upper stratum, of a thickness from fifteen to thirty feet, is almost universally tinged

red or ochry, by the abundance of iron oxyde with which it is impregnated.

Locality of the section lying bare, extent, thicknes.

The coal is visible either in its native locality on the side of a monsoon rivulet, or is to be found in pieces in the bed of the same rivulet.

This deposit is neither covered with porphyry, nor red sandstone, nor arenaceous beds belonging to intermediary formations; above it are only placed alternating beds of slate clay, either bluish grey or whitish, either friable or compact, and then carburetted Brand-striefer, and these strata taken altogether are not more than three and a half feet in thickness, above which rest the above mentioned iron-tinged earthy clay and alluvium. At this place the coal may be calculated to be seventeen feet below the surface on an average.

On the sides of this rivulet or channel, dug out by the impetus of the water, a section is exposed of fifty-four feet in length, and the same formation is traceable more than one mile to the north, and six west.

The thickness of this coal stratum is as yet not ascertained, on account of the water accumulating in the rivulet, the rainy season having begun; but it must be considerable, as at a depth of six feet no other alternating formation has been found. In consequence of this the nature of the sub-stratum cannot be yet determined.

This stratum runs nearly in a direct line from north to south, and dips under an angle of 26° east to the horizon. In two places it is contracted, in the rest uniform.

Mineralogical classification.

It is difficult to classify exactly this coal, on account of its modifications in different pieces. It belongs to the sub-genus black coal, but there are several species even in the seven tons which have hitherto been brought to light.

Some pieces participate greatly of the character of Cannel-coal, these having a resinous lustre and a flat conchoidal fracture; the pieces nearer to the surface have again more of the character of slaty coal, with a slaty fracture, fragments trapezoidal; the greatest number, however, hitherto observed refer it to glance coal, sub-species pitch coal, being massive, in botryoidal loam, with a woody texture, fracture large, perfectly conchoidal, fragments sharp-edged, undeterminated angular. The dendritic texture is a peculiar feature of this coal, not observed in any of the other coal species hitherto found in the Tenasserim provinces.

Chemical analysis of the coal.

A hundred grains of the coal previously reduced to small pieces were placed upon a platina sheet, and put over a lamp fed with alcohol; on becoming red hot, they baked slightly together, and on being removed from the fire assumed an iron grey co-

lour; one hour and six minutes elapsed before the hundred grains were totally consumed, the residuum was greyish ashes—from 100 parts 2·8 remained of them. The ashes subjected to chemical analysis were found to consist of *silica* and *alumina*, with scarcely a vestige of iron.

The coal considered in a practical point of view.

1. Generally speaking the coal is very good; but one great defect cannot be concealed, and this is, that some parts of it are highly pyritiferous, the pyrites intersecting it in thin laminæ of a silver-white, somewhat yellowish colour. Fortunately only some parts are thus deteriorated, but even these it is to be hoped will not be lost, as the thin layers of pyrites are easily separated; that part of the coal which cannot be conveniently rendered destitute of this bi-sulphuret of iron ought to be rejected, which necessary selection will have an influence, perhaps materially, upon the price of the coal.

We can at present speak only of the coal near to the surface and exposed partially to atmospheric influence, but it is to be hoped that the coal will be much purer the farther it is from the surface.

2. The pure coal (free from pyrites) burns freely and open; transformed into coke it bakes a little together. It emits in the beginning copious flames, which are blackish grey, and unmixed with sulphuric vapours.

General results.

a. That the coke of this coal is well adapted for smithy purposes.

b. That the coal (excepting always the pyritiferous strata, especially near to the surface) is remarkably pure, and fit to burn as fuel in chimneys.

c. That the coal consumes slowly, maintains a considerable degree of heat, and leaves a residuum of only three per cent at the highest, and that it is therefore adapted for steam purposes.

d. That it is inferior to the Cannel coal on the little Tenasserim for the generation of gas, on account of the smaller per centage of bitumen.

The locality for transport is very favourable; and the greatest advantage consists in the almost total absence of land carriage.*

Locality with reference to access, transport.

The present coal field lies on the western side of the Tenasserim, 1712 paces following the road, and probably not more than 400 fathoms in a straight line from the river.

The Tenasserim notwithstanding its long course, continues to be a mountain stream even when already under the influence of the tides. As such it has a rapid current, numerous shallows, annually changing banks, and shifting shoals. During the dry season it is at the place

* Sic in M.S.—Eds.

the nearest for the embarkation of the coals impracticable for boats drawing more than seventeen inches; in this part of the river the coals will therefore probably be transported upon rafts of bamboos. After the confluence of the higher and lesser Tenasserim the river increases considerably in depth.

Captain R. Lloyd surveying the lower part of the river last year, was of opinion that vessels of 100 tons burthen might go up to Tenasserim town, but thinks it advisable to employ only vessels of a much smaller size.

Prospect of other localities nearer to the sea-coast.

It is very probable, judging from the formations, that the same field extends some twenty miles lower down the river, and that beds may be found still nearer the banks of the river; but under present circumstances the transport twenty miles more or less *by water* is scarcely of any consequence; experimental researches therefore would, besides being very expensive, prove precarious.

The existing formations (as far as they are known) to the west, and those in a parallel line on the sea-coast, preclude the hope of coal being found there.

History of this discovery.

Last year, in, March, when I first visited the banks of the Tenasserim, I was struck, in coming to its lower part, with the sudden change of the geognostic features of the country. The river instead of running for many miles through a mountainous country, its narrow bed inclosed between piles of granular talcose limestone, graywacke, greenstone, and transition porphyry, burst at once into an open country, the ridges of the above mentioned formations receding on both sides, and I found what I had missed for a long time—secondary formations; and what I desired the most—formations belonging to the great independent coal deposits. Having given up all hope of finding coal in the parts of the Tenasserim provinces hitherto visited, I was at once animated with strong hope of success at the sight of these promising features.

The consequence proved this time, in a conspicuous manner, the truth and exactness of geognostic principles, and I found successively three localities of coal, mentioned in my last year's report sub: N. A. B. A. C. of which specimens were sent up to Calcutta. However the coal then found was all of indifferent quality, and, besides, not favourably situated; the excellent coal discovered afterwards on the little Tenasserim belongs to quite a different system.

Convinced however of the existence of coal over a wide extent of that district, in fact expecting that the above mentioned plain through which the Tenasserim runs is a segment of a great coal basin, I

stimulated the Careans, the only inhabitants of that part of the country, to be assiduous in finding coal. I gave them samples of that mineral, which scarcely any one of them had seen before, and taught them to look for it in the beds of mountain torrents, on steep banks of rapid rivers, on parts of mountains or hills detached by the violence of the monsoon, &c., for they had generally imbibed the erroneous opinion that coal is only found on the summits of high mountains which formerly were in a state of combustion, and that coal is a species of cooled lava.

Fearing however that their natural apathy might prevent them from any exertion, I promised a reward of 50 Rs. to be given to any body who found coal of good quality not far from a river.

By a rather extraordinary coincidence, the present coal was found but a thousand yards distant from the place where I made the promise of the reward, and in the same village, the inhabitants of which accompanied me for three days in search after coal in the surrounding jungles.

A Carean of that village of the name of Ka-pho, penetrating two months and a half ago the thick forests in search of good ground for a plantation, came upon a small rivulet, and found coal partly at its bottom, partly protruding from its banks.

My lesson, but much more, undoubtedly, the prospect of the Fifty Rupees' reward, seemed not to have been forgotten. He took some pieces home, and kept them hidden for several weeks, not knowing if they were really coal, for the pieces which I distributed among the Careans were Burdwan coal of a different aspect. He consulted a friend afterwards, who advised him to go to Mergui and show the coal to me, but being apprized that I was absent (examining the Mergui Archipelago) the visit to Mergui was postponed. About a month afterwards a Burmese, of the name of Kho-baik, saw the specimens of coal by accident in a basket; he possessed himself of a piece, and hastened with it to Mergui to claim the reward for himself; he shewed it to the Assistant of the Commissioner in Mergui, and in this way the coal was brought to public notice.

(Signed) J. W. HELFER, M. D.

MERGUI, *9th May*, 1839.

No. 2.—Report on the new Tenasserim Coal Field.—By LIEUT. HUTCHINSON, *Madras Artillery.*

To E. A. BLUNDELL, ESQ. *Commissioner, Tenasserim Provinces.*

SIR,—Having visited the coal field lately discovered upon the large branch of the Tenasserim river, I do myself the honor to forward a Chart of the river from the Coal to Mergui, and beg to offer some remarks for your consideration.

The coal is situated in north lat. 12° 21′ 30″, and longitude about 99° 5′ east, distant twenty-nine miles, by the course of the river, from Tenasserim, or about sixty-five miles from Mergui; the distance in a direct line from Mergui is about twenty-eight miles in a west by south direction.

A small stream passes through the upper part of the coal bed, exposing part of a thick stratum of coal covered by three feet of clay slate, and from twenty to forty feet of sand.

The sand may be removed easily with any tool, but at the same time is so tenacious as to require no propping where springs do not exist, and the slate being only three feet thick shafts may be sunk with celerity and ease.

Whether the galleries will require propping is doubtful; but if so, abundance of timber for the purpose exists upon the spot.

Springs will certainly be met with at the level of the slate, but this must always be expected in a coal mine.

The Nulla is quite unfit for the conveyance of coal to the river, but, a level line of road may be formed with little expense.

The coal is distant from the river about one mile.

The river may be ascended during the fine weather with an ordinary number of men to each boat, but the water is upwards of twenty feet higher during the rainy season, and it appears doubtful whether proper boats could be got up during that time, at any rate without the assistance of steam, or some adequate power.

The shallowest water at this time of the year (when it is lowest) is eighteen inches. The river is therefore navigable for boats drawing nine or twelve inches, and of thirty feet in length by ten in breadth, capable of carrying six or seven and a half tons.

Allowing one man to every ton of coal, four days will be required to bring the coal down to Mergui, and at least five to return with the boats; making the expense of actual transport one man's hire for nine days, or three Rupees per ton, exclusive of its carriage from the mine to the river.

Referring to the Chart, the question presents itself whether a line for a road could not be formed from the coal to some point near to the place called Peagune. The country between this and Tenasserim is

mountainous, but the ridges run in nearly the same direction as would the road, and from the numerous large nullas falling into the river near to Peagune it appears possible that a practicable line might be formed. The distance is only fifteen miles.

A tolerably level railway across this part of the country would reduce the expense of actual transport to Mergui to one man for four days to every one and a half tons of coal, or to nearly one Rupee per ton, supposing the carriage is to be drawn by men; but by employing ponies the price is reduced to less than four annas a ton. Now in case of delay and extra power being required in some parts of the line, take the expense at three times the estimate, or twelve annas per ton, which is still only a quarter of that incurred in the transport by water; thus being a saving of 22,500 Rupees in favor of the road upon the transport of 10,000 tons of coal.

The best description of road for this country appears to be a single suspension rail of timber (as represented by figures 1 to 4 in the enclosed sketch) as being cheapest in construction, uninjured by heavy rain, easily repaired, and (by actual experiment) offering less resistance to the motion of carriages than any other form of road. It consists of a plank of hard wood, three inches broad by ten or twelve deep, supported on posts nine or ten feet apart, and varying in length according to the surface of the country passed over, so as to support the rail in a horizontal line. The rail is let into a notch cut on the top of the posts, and is adjusted by means of wedges driven in opposite directions between the posts and the rail; the resistance is reduced thirty per cent. by the addition of a thin plate of iron upon the top of the rail. A carriage having only two wheels with the load suspended on either side is represented in figures 1, 2, 3.*

A road on this principle has been tried with great success in England. A horse was found capable of dragging fourteen tons, exclusive of the carriage, during a good day's work where the rail was quite level. Figure 4 shews the manner of crossing streams and small ravines.

I have no doubt but these carriages would run upon a cable stretched from point to point should circumstances require it.

Models can be furnished if required. I have, &c.

(*Signed*) C. H. HUTCHINSON,

Mergui, *6th May*, 1839. *2d Lieut. Madras Artillery.*

(A true Copy.) E. A. BLUNDELL,

Commissioner in the Tenasserim Provinces.

---

* We have not received Lieut. Hutchinson's sketch, but his description is nevertheless sufficiently intelligible. The subject is of so much interest that we deem it ex-

pedient to publish the annexed extracts from the description of Palmer's Railway, given in Hebert's *Engineer's Cyclopedia*, Vol. 2, pp. 425, &c.

"Instead of two lines of rail laid upon the ground, as heretofore, Mr. Palmer's railway consists of only one, which is elevated upon pillars, and carried in a straight line across the country, however undulating and rugged, over hills, valleys, brooks, and rivers, the pillars being longer or shorter, to suit the height of the rail above the surface of the ground, so as to preserve the line of the rail *always straight*, whether the plane be horizontal or inclined. The waggons, or receptacles for the goods, travel in pairs, one of a pair being suspended on one side of the rail, and the other on the opposite side, like panniers from the back of a horse. By this arrangement only two wheels are employed, instead of eight, to convey a pair of waggons; these two wheels are placed one before the other on the rail, and the axle-trees upon which they revolve are made of sufficient length and strength to form extended arms of support, to which are suspended the waggons or receptacles on each side of the rail, *the centre of gravity being always below the surface of the rail.* The rods by which the waggons are suspended are inflexible; hence, although the weights on each side be not equal, they will, nevertheless, be in equilibrio; as may be observed in a ship, which, being unequally loaded, assumes such an angle with the surface as preserves the equilibrium. Although an equal distribution of the load on both sides is desirable, it is not necessary. A number of carriages are linked together, and towed along the rail by a horse, as barges on a canal. Owing to the undulation of the country, the horse will sometimes be much below the rail, in consequence of which he is provided with a sufficient length of rope to preserve a proper angle of draught.

"Provision is made for trains of carriages that are proceeding in opposite directions, by means of "sidings" or passing places. With respect to loading, if both receptacles be not loaded at the same time, that which is loaded first must be supported until the second is full. Where there is a permanent loading-place, the carriage is brought over a step or block; but when it is loaded promiscuously, it is provided with a support connected to it, which is turned up when not in use. From the small height of the carriage, the loading of those articles usually done by hand becomes less laborious. The unloading may be done in various ways, according to the substance to be discharged, the receptacles being made to open either at the bottom, the ends, or the sides. In some cases it may be desirable to suspend them by their ends, when, turning on their own centres, they are easily discharged sideways.

"Among the advantages contemplated by the patentee of this railway, may be mentioned that of enabling the engineer, in most cases, to construct a railway on that plane which is most effectual, and where the shape of the country would occasion too great an expenditure on former plans—that of being maintained in a perfectly straight line, and in the facility with which it may always be adjusted; in being unencumbered with extraneous substances lying upon it; in receiving no interruption from snow, as the little that may lodge on the rail is cleared off by merely fixing a brush before the first carriage in the train; in the facility with which the loads may be transferred from the railway on to the carriages, by merely unhooking the receptacles, without displacing the goods, or from other carriages to the railway, by the reverse operation; in the preservation of the articles conveyed from being fractured, owing to the more uniform gliding motion of the carriages; in occupying less land

than any other railway; in requiring no levelling or road-making; in adapting itself to all situations, as it may be constructed on the side of any public road on the waste and irregular margins, on the beach or shingles of the sea-shore,—indeed, where no other road can be made; in the original cost being much less, and the impediments and great expense occasioned by repairs in the ordinary mode, being by this method almost avoided.

"A line of railway on this principle was erected, in 1825, at Cheshunt, in Hertfordshire, chiefly for conveying bricks from that town, across the marshes, for shipment in the river Lea. The posts which support the rails are about ten feet apart, and vary in their height from two to five feet, according to the undulations of the surface, and so as to preserve a continuous horizontal line to the rail. The posts were made of sound pieces of old oak, ship timber, and in *a*, the slot or cleft at the upper ends of the posts, are fixed deal planks twelve inches by three, set in edgeways, and covered with a thin bar of iron, about four inches wide, flat on its under side, and very slightly rounded on its upper side; the true plane of the rail being regulated or preserved by the action of counter wedges between the bottom of the mortices, and that of the planks. By this rail, on the level, one horse seemed to be capable of drawing at the usual pace about fourteen tons, including the carriages.

"The late Mr. Tredgold, whose opinion in matters of this nature will ever be entitled to attentive consideration, expressed himself very favourably to this invention in his *Treatise on Railroads and Carriages*:— "We expect (he observed) that this single railroad will be found far superior to any other for the conveyance of the mails, and those light carriages of which speed is the principal object; because we are satisfied that a road for such carriages must be raised so as to be free from the interruptions and crossings of an ordinary railway."

Art. VI.—*Memoria sul Renascimento e stato atticale della Medicina in Egitto, del* D. G. E. Mino.

Memoir on the Regeneration and actual state of Medicine in Egypt—Translated from the Italian of J. E. Mino, *Doctor in Philosophy, Medicine, and Surgery. Leghorn,* 1838.

(For the Journal of the Asiatic Society.)

We are indebted to Mr. W. H. Cameron for a copy of Dr. Mino's pamphlet, which was printed in Europe for private circulation, and contains many details worthy the close attention of all who take interest in the progress of general as well as Medical education.

Dr. Mino's essay affords full evidence of the failure of Clot Bey's system for the introduction of Medical science into Egypt. The causes of the failure are moreover explicitly and palpably exhibited. There was no penury of means, no paucity of teachers; all that the most princely munificence could place at the Bey's disposal he was permitted to command without controul. Still the tree produced no fruits, and this simply, because it was planted at the wrong end. They commenced where they should have terminated; namely, by the erection of a School taught in the vernacular language. It is difficult to conceive a more ludicrous attempt than that to teach me-

dicine to Arab pupils through European Dragomans, themselves destitute of Medical knowledge. Far different would the result have been, had the admirable principle of the Normal schools of Prussia and France been adopted in the first instance—had CLOT BEY for the first four years contented himself by educating thoroughly a few clever youths through the medium of *his* language, and had he then employed them to impart, in their own tongue, the knowledge they had themselves acquired.

Such is the system which silently and unprofessedly has been adopted in the CALCUTTA COLLEGE with a success which defies denial. If but few pupils have been educated, the completeness of their education is unquestionable; and each is now ready to be made the means of diffusing his own knowledge among his countrymen in the only dialects they understand.

In September next the Medical College of Calcutta ceases to be *exclusively* an *English* School, and will embrace, with its original Normal section, a secondary vernacular class, receiving instruction, through the Hindoostanee language, from native teachers, and numbering over 150 pupils. Let this class but prosper, as we doubt not it must, and then indeed we may triumph in accomplishing the inappreciable object of placing medical assistance practically within the reach of all classes of the Native population. Similar institutions will then spring up in all the great provincial cities, and thus to every village and hamlet will radiate the light of the most beneficent science within the acquisition of man.—EDS.

Prior to the reform introduced by the Pacha and Viceroy MEHEMET ALY, medicine was in the same state in Egypt as in other parts of the Levant; it was, namely, in a state of absolute infancy, or to speak more accurately, in one still inferior to infancy itself. Not possessing schools or masters, books or dissecting-rooms, nor any other place of public or private instruction, the natives who devoted themselves to the care of the general health, following corrupt traditions, practised a blind empiricism which, mingled with a certain superstitious charlatanism, was more adapted to disseminate death, than to prevent the premature diminution of lives. Foreigners who there practised medicine were generally persons destitute of science and of conscience, and abusing the unfortunate licence given to all of calling themselves *Physicians*, they simulated the character that they possessed not, and thus profaned the sublime priesthood of Hygea, to the incalculable detriment of the wretched. The true and clever physicians, who for merit and legal qualification could be entitled such, in Egypt were very few, and often disregarded and forgotten; as not unfrequently happens in unpolished and illiterate nations, to the truly learned placed in counterposition to the charlatan.

Although the French claim for themselves the work of the regeneration of medicine in Egypt, it is undoubted, nevertheless, that the glory of the enterprise, whatever it may be, is due to the Italians. In truth, since Egypt began to breathe, which was about the year 1811, when MEHEMET ALY completed his sanguinary struggle with the

Mamelukes—a year that signalized the commencement of new military reforms—the first roots, so to speak, of the medical laurel were planted there by Doctors MENDRICI (Genoese), RAFFAELLI (Leghornian), MARTINIL (Pisan), DEL SIGNORE (Piedmontese), CUNHA (ditto), KARACUCCI (Cattarese), MARNECHI (Piedmontese), GENTILI (of Ancona) CERVELLI (Pisan), MORPURGS (of Trieste), DURANDO (Piedmontese), CALUCCI (Neapolitan), LARDONI (Roman), VERNONI (Piedmontese), and several others, all Italians, too numerous to be mentioned; whereas in that long period the French could reckon no other countryman of their's than a certain M. DUSSAP, Apprentice-Surgeon.

Nor should, on the contrary, all the French professors be cited who followed the memorable expedition of 1798, in as much as those were days of battle, and those personages, albeit highly eminent, had no opportunity of mixing as much as was necessary with the aborigines, of coming in contact with the native physicians, and of diffusing, by word and example, the salutary precepts whereof we intend discussing. In fact, after their departure no vestige remained of their knowledge; we mean, not a school, not a scholar, no prevailing system, no sensible sign was to be discovered, that denoted any tendency to the destruction of the abominable empire of empiricism and imposture.

The light of true knowledge illuminates in the end even the dimmest and most near-sighted. Hence, notwithstanding their deeply-rooted and numberless prejudices and antipathies, the Arabs finally discovered the difference that existed between European doctors and those quacks who for so long a period had usurped among them the name and attributes of physicians.

MEHEMET ALY above all, who was then devising a bold, political reform of the state which had been placed in his hands by fortune and courage, convinced by experience, and by the dint of warm, benevolent suggestions (among which held the foremost place those of the CHEV. DROVITTI, Piedmontese) perceived the inestimable service that so grand an enterprise could derive from the Art of Healing suitably professed, and delayed not to make the talent of the European physicians contribute to his mighty undertaking.

In the year 1822 Doctors MARTINI, DEL SIGNORE, CINBA, and some others, were charged by him with the erection at Abou-Zabel of an Hospital, modelled and managed after the best European establishments of its kind, and were directed to lay before him a plan of a general systematic arrangement of the Medical Service in the Vice-royalty. This is in reality the era of the regeneration of medicine in Egypt; and if the foundations of it were laid by Italian hands, we must legitimately conclude that the glory of having re-produced medi-

cal studies, and the practice of medicine in Egypt, exclusively belongs to them.

Nevertheless it is undoubted, that scarcely had the Italians taken the first step in the beneficent restoration (1824,) than the eminent Doctor CLOT, a Frenchman in the Viceroy's service as Physician and Surgeon-General, succeeded, with several other sanitarian officers, countrymen of his, in completing the fabric thus commenced; and we are far from denying him our meed of well-merited praise, and avow and acknowledge with pleasure the very important services rendered by him to the science and to the country. But he *completed*, and did not *commence*, the work: this is what truth compels us to affirm distinctly. Especially as in all the improvements introduced by him, his designs were never disunited from those of MARTINI, Inspector-General of the Military Medical Service.

Au reste, when we allude to the regeneration of medicine in Egypt, we are very far from understanding that the science is as flourishing and diffused there as the phrase may seem *prima facie* to imply; for although there exists a remarkable difference for the better between the past and the present, it is undeniable, nevertheless, that the new plant has not yet produced that fruit which might have been expected from it. A mournful fact, but no less authentic, as will evidently appear from the particulars we are about to enumerate.

Having premised these brief observations on the historical part of the subject (for the correctness of which we ourselves carefully vouch, having been not only witnesses, but a party of what we relate) we shall now proceed to lay down, in separate paragraphs, those special points, from the assemblage of which results the actual state of medical knowledge in that country.

The establishment of an Hospital at Abou-Zabel (a village about twelve Italian miles to the north of Cairo, on the borders of the desert of Kanka) was, as we have stated, the first countersign of the regeneration of medical knowledge in Egypt.

Beside the salubrity of the air, and the abundance of water (although the latter is somewhat brackish), and all other conveniences requisite for the erection of such institutions, all wonderfully concurring at Abou-Zabel, this spot was selected especially because being close to the review-field of the new Egyptian troops, it might readily serve for the care of the invalids; and the Government would thus have before its eyes a practical example of the advantages that its armies might in time derive from that sort of sanitary establishments.

The edifice was erected A. D. 1822 on the ruins of ancient cavalry barracks: it was completed six years after (1827) when Dr. CLOT,

recently charged with the head management of the Sanitary Department, made it the object of his most ardent solicitude.

The Hospital of Abou-Zabel, which surpasses in size, as it does in priority of existence, all similar buildings subsequently erected in Egypt, is a perfect square of 150 metres, every side consisting of a double row of saloons, divided by an intermediate corridor forming their entrance. There are thirty-two halls, each containing fifty beds arranged in a double row. The saloons are exceedingly lightsome and well ventilated, being illuminated each by sixteen large windows, which however does not debar the deplorable effects that result from the reunion of an immense number of sick in a single edifice—a constant proof that smaller Hospitals are preferable to extensive ones in all quarters of the globe.*

The area enclosed within the four sides of the building has been appropriated to the use of a Botanical Garden. In the middle of it is to be found a square house containing the Dispensary, Dissecting Room, Baths, Kitchen, a *Sakia*, or draw-well, and other ordinary complements of an Hospital.

The Botanical Garden is subdivided into two sections, containing an exact repetition of the identical plants. The first is appropriated to the study of Linneus' system, and the other to that of Jussieu's method.

The edifice is surrounded on three sides by a high wall, about a hundred paces distant from the body of the building. The vast tract of land intervening between the one side and the other is covered with trees and divers other plants, which abundantly supply fruits and other nutritious vegetables; it also offers a commodious promenade to the invalids. This exterior wall answers the purpose of *isolating* the establishment—an inestimable advantage for various reasons, especially in countries like Egypt, frequently infested with contagious maladies.

Although the Hospital of Abou-Zabel is chiefly intended for the

* We recommend this passage to the attention of the Municipal Committee, and of the projectors of certain Hospitals said to be intended for Calcutta. The new Clinical Hospital just completed on the grounds of the Medical College will contain *eighty* patients. It is a square building on arches, 74 feet square, divided into three Wards with two intervening Corridors. The clear length of each Ward is 70 feet, the breadth 20 feet, the height 18 feet, and the Corridors each 70 feet long, 12 feet broad, and 18 feet high. The rooms are fully ventilated by lofty windows, doors, and spiracles. *This building has cost but* 8,000 *Rs.* In the plans adopted by the Municipal Committee an Hospital for *one hundred and twenty* patients is to cost 97,000 Rs., another plan for an Hospital for *twenty* patients is sanctioned by the Committee at 34,000 Rs. This may excite a smile, but let us not be unreasonable. It is peradventure wise to lodge the perishing pauper with the magnificence of a prince.—Eds.

military, still the indigent sick of all the surrounding villages obtain there gratuitous succour and advice.

The internal government of the Hospital, and in general all its various departments, were scrupulously modelled after the Hospitals of Europe.

The utility of the establishment in question being rapidly understood, with that evidence which is so necessary to influence the indolent spirits of the Easterns, other minor Hospitals began to be gradually instituted in various quarters of the country, there being at present six, beside several Infirmaries; viz. one at Cairo, named *Esbequich;* one at *Kassr-el-ain*, for the alumni of the elementary School-house; a third at *Furrah;* a fourth at *Damietta;* and the fifth and sixth at Alexandria for the army and navy troops.

Prior to the year 1834, there was no Hospital specially intended for non-military patients. The decree issued about that period by his Highness may be considered an interesting piece of novelty, because one of the Alexandria Hospitals, which had been originally destined for the navy, was then thrown open indiscriminately to all, whether Arabians or Christians, or of any other persuasion, as well subjects as foreigners, if destitute of means.

Although that was perhaps the effect of the wise REFORMER'S policy, it was nevertheless a remarkable token of progress, when we reflect on the antipathy that had for the past divided the Mahometans from the professors of every other creed.

With regard to the Hospital of Abou-Zabel, and the two others of Alexandria, especially that denominated *Ras-el-tim*, it can be affirmed, without flattery, that they are in a most satisfactory state at present, and that they might be honorably compared with many similar institutions in Europe. The others, mostly the work of Arabs, and imperfect copies of the former prototypes, still retain the impress of antique barbarism, and to them may be justly applied the words of the divine Poet:

"Non ragioniam di lor, ma garda e pass."*

Following the example of Constantinople, Smyrna, and other cities of the Levant, the European powers that hold commercial intercourse with Egypt established an Hospital in Alexandria for their respective subjects, with this difference however, that while in the above named cities each European nation has it own Hospital apart, in Alexandria, considering the minor number of European strangers, they deemed one Hospital, to be managed with common funds and laws, would

* "Let us not speak of them, but look and pass on."—DANTE.

amply suffice promiscuously for all. The election of the Physician and other officials for this institution, is yearly made by the Consular body and other contributors by the majority of votes. Extreme is the neatness and regularity of attendance introduced into this Hospital, and we are gratified in being enabled to bestow our well-merited meed of praise on the directors of it, while we, at the same time, submit our hope, that in the election of the Physician, they may for the future value more than they have heretofore done, the intrinsic merits of the individual, and pay no regard to a spirit of vain nationality, which so often proves fatal to its unfortunate inmates.*

Regarding those infected with the plague, we shall have occasion to allude to them when speaking of the Lazarettos, in the important matter of sanitarial treatment.

The rare advantage of the Abou-Zabel Hospital induced Dr. CLOT, Physician-General, to propose to the Egyptian government the institution of a Medical School for the formation of Native alumni, capable in time of succeeding the European doctors, on whom depended the medical management and attendance both of that head Hospital and of the other Infirmaries, as well as of the army. The body of European physicians then practising in Egypt, fortunately presented the number of Professors requisite to occupy the various chairs of the intended institute, and Dr. CLOT wisely opined that so favourable an opportunity should be availed of to attain with facility and economy the object he had in view. The necessity of such an establishment was too evident for the Egyptian government not to second the proposal of the French Physician-General; but there were mighty and various obstacles yet to be surmounted.

* It would not be here inopportune to make mention of a small Greek Hospital, if it were completed, or worthy of observation. Hence we omit enumerating it among the Hospitals of Alexandria. Nevertheless we cannot refrain from commending the noble efforts of the CHEV. FOSSIZZA towards its erection and support, in which he has not yet relaxed.

Apropos of the above mentioned individual, we feel pleasure in giving a brief account of his merits and influence in Egypt.

The CHEV. FOSSIZZA, a wealthy Greek merchant of Mezzovo in Albania (Epirus), and now Consul-General of his Majesty King Otho, is one of the most distinguished personages who are about the illustrious Reformer, MEHEMET ALY, on account of the high degree of confidence he enjoys, in as much as being wholly devoted to his wishes, he succeeded so well both in the administration of the state, and in the most difficult political circumstances of the Government, in comforting him, by seconding all his cogitations and devices, as well as by assisting him with his vast commercial knowledge in his traffic computations, and so by reviving in an extraordinary manner the home as well as the foreign trade; moreover, he is still more commendable on this account, because he uses his interest with the Pacha to forward the distribution of his princely munificence among the meritorious. Hence the CHEV. FOSSIZZA is generally esteemed by the Europeans as well as the foreign Consuls in Egypt.

The first obstacle was the impossibility of finding *eleves* who could speak French, Italian, or any other European tongue. This could not be overcome but through the means of interpreters, who might convey to the scholars the sentiments of the Professors. But in order that the interpretation of such mediums might be correct, they themselves should indispensably have been initiated in the science they were to convey: whence the interpreters were necessarily to be instructed prior to the *eleves*.

The second was to introduce among the Arabs the study of anatomy, which involved the dissipation of their religious prejudices, as to them it appears an enormous sacrilege to apply a dissecting knife to the remains of the defunct.

The third, finally, was the deficiency of books, instruments, and that multifarious assortment of other implements, which are essential for the first opening of such an establishment among a barbarous and unpolished people, like the Egyptians.

All these difficulties, albeit numerous and intricate, disappeared before the zeal of Dr. CLOT, and of the head Physician and Inspector-General, Dr. MARTINI; and in a short period Egypt saw opened at Abou-Zabel a School of Medicine, which, although imperfect like every other infant institution, resembled Aurora, the forerunner of light, amidst the darkness of deep and disgraceful ignorance.

The first obstacle alluded to was surmounted by appointing various interpreters, sufficiently instructed in the oriental languages, and not totally unacquainted with medical pursuits. In the mean time, however, so as not to be perpetually obliged to have recourse to their assistance, which was essentially supplementary, a course of European languages, especially French and Italian, was commenced. Signor UCELLI (Piedmontese) and Signori RAFFAEL, AUTHORI, SAKAKINI, and ZACCARA undertook and supported with honor this double duty of interpreting the lectures of the Professors, and of instructing the Arabian alumni in the European tongues.*

The second impediment was overcome by the firmness of the Government, and its well known indifference for religious opinions, as well national as foreign. For by suggestion of the European doctors the most influential Sheiks were informed that the opening of the dead for the benefit of the living, in place of being brutality and cruelty as they would fain have it believed, was a pious and philanthropic act; and they were shown that the Pacha in this respect had no intention of being annoyed; and so shortly disappeared all objections

* The respectable Signors should have commenced by studying medicine themselves.—EDS.

on that score, in so much that cadaverical dissections are now performed in Egypt with the same facility as in our own country.

The third difficulty likewise the Government remedied, by liberally supplying, at an enormous outlay, a splendid assortment of books, anatomical figures, surgical instruments, and every thing else requisite for the institute; whence we may affirm, without exceeding the truth, that in this it was rather extravagant, than parsimonious. A proof of this may be the Venus, made with wonderful nicety in Florence, by the chisel of the renowned Chev. Vacca Bellinghieri, and purchased for the Abou-Zabel School at the enormous sum of 3000 dollars and upwards.*

Thus surmounted the impediments that obstructed the accomplishment of this beneficent design, the next step was to regulate the course of studies, and to nominate the Professors. These operations had the following results.

1. Signor Gactini, Professor of general, descriptive, and pathological Anatomy, and of Physiology.

2. M. Beruard, of private, public, and military hygiene, and legal Medicine.

3. M. Duvigneau, of Pathology, and internal Clinics.

4. M. Clot, of Pathology and external Clinics, Operations, and Midwifery.

5. M. Barthelemy, of Materia Medica, Therapeutics, the Art of Formulas, and Toxicology.

6. Signor Celesia, of Chemistry and Physics.

7. Signor Figari, of Botany and Horticulture.

8. Signor Lasperaura, of Anatomical and Pathological preparations.

These were the Professors of the Abou-Zabel School at its first opening; but there were shortly after some remarkable changes which we deem superfluous to relate. We must however, for justice sake, remark, that besides the distinguished Dr. Clot, the two Italian Professors Celesia and Figari, (the latter a worthy pupil of the late Chev. Viviani), among the other above named, acquired especial esteem, and marked encomiums in the discharge of their duties.

We should be too prolix and fastidious, were we to enter into a detailed account of the various scientific improvements introduced into this School, and especially regarding the translation and explanation of the lectures, through the medium of the interpreters. We shall nevertheless observe, that at the close of every year a public examination was appointed to be held, at which the Arabian alumni should

* About 6500 Rupees.

give a trial of the progress they had made, in the presence of the first authorities, as well in their medical, as in their philological studies.

The result of those examinations proved, what will not surprise any wise judge of such events, viz. that the progress of those classes, notwithstanding the immense effort of the promoters, was not by any means remarkable. In truth, with the exception of a few lads, who succeeded in a middling degree, the mass of the scholars drank very shallow of those new and unusual sources of science. It would be long to enumerate all the causes of such disgusting deficiency individually, but we will note the chief ones: 1. The advanced age of the majority of the students. 2. The privation of those elementary and primary principles, that are a step to higher branches. 3. The fatal intricacy of intermediate explanations. 4. Arabian indolence and listlessness, which every now and then transpire in the character and habits of that race. 5. The secret and powerful influence of prejudices, which although sometimes apparently obviated, never cease by degrees to shoot forth. 6. In fine, the bad selection of some of the teachers; a notorious fact, which we in vain would attempt to conceal.

Dr. CLOT added lately to this College a collection of objects connected with Entomology and Ornithology, aided by the rare abilities of the Turinese naturalist, Signor LOVIS REGEO, who has acquired an honorable reputation both in Egypt and elsewhere, which we are happy to proclaim, for such and other similar collections forwarded abroad.

The nature and brevity of this memoir will not permit us, as we would wish, to give a minute account of the glorious labours of the illustrious young man just alluded to, in congregating the materials of such exquisite collections, as well of the extraordinary perfection for which his works are distinguished, considered even in the light only of mechanical preparation: we will not however for justice sake, and to satisfy a praiseworthy love of country, omit to state, that not only CLOT BEY, but also all the other professional foreigners that have visited Egypt, or examined the works of Sig. REGEO, unanimously avowed, that they had never witnessed things of a similar description more accurately and skilfully conducted; and they readily bestowed on him, even through the medium of the public journals, praise so much the more flattering, as it was less suspicious, being spontaneous and remote. Hence although Sig. REGEO be, like all other men of merit, extremely modest, an enemy of every species of intrigue, and incapable of wishing to advance but through his own fatigue and knowledge, the Egyptian Government nevertheless always held him in due esteem, and after retaining him in divers ways employed

under CLOT BEY, it decorated him at length with the title and degree of Professor attached to the Museum of Natural History, an office with which he is still invested, with general satisfaction, uniting as he does to a brilliant genius an excellent heart, that renders him acceptable and dear to all his acquaintance and friends.

Besides the alumni educated (well or ill) in the Abou-Zabel College, the Pacha sent to Europe, especially to France, about one hundred Egyptian lads, with the view of thus diffusing the enlightenment and civilization of this era throughout his dominions, and of acquiring at the same time the reputation of a prince who was a philosopher, a philanthropist, and a munificent patron of the sciences. The result of the second experiment was not much happier than that of the first, as the youths did not take back with them that useful assortment of science that was expected; so that with the exception of a scanty number, the major part of them afforded to the Pacha no great source of congratulation for the trial he had made.

Vaccination was introduced into Egypt about the year 1824, through the beneficent designs of the venerable CHEV. DROVETTI, whose continual traits of philanthropy resemble so many globules impregnated with vitality, which animate and give life to whoever receive them. With the approbation of his superiors, he formed a commission consisting of two Italian physicians, MASSARA and CANI, and of one Frenchman, M. DUMAS, for the purpose of propagating in the interior of the country the practice of so precious an invention. This commission, provided by the never-sufficiently commendable CHEV. DROVETTI with all the necessaries, encountered in the discharge of their duties immense difficulties and perils, so much so, that in the province of *Menoufic* a general insurrection was very near breaking out, as the Arabs, especially the women,* supposed that the incisions made on the arms of their infants, far from being a salutary antidote, were a political stratagem of the Pacha, whose object was to impress on the persons of his subjects an indelible mark, so as afterwards to be enabled to distinguish and kidnap them with greater facility into the military levies, and other raisings of men for the accomplishment of his vast enterprises; so that after long and fruitless attempts the vaccination emissaries were compelled to desist and give up all hopes of success; and thus among the Arabs became extinct the practice of JENNER's antidote, which is doubtless one of the finest gifts bestowed by Providence on mankind in modern times. This is a great fatality for Egypt, where the small-pox frequently causes mortality in the extreme.

* It is calculated that the proportion of women at present in Egypt, is a third greater than that of men.

H. H. MEHEMET ALY continues however to have his children vaccinated, as also the new born infants belonging to his Harem and household, which is also the practice of the grandees around him.

The first and greatest service that was to be rendered to Egypt by medicine, was to defeat the fatal malady that for ages had taken up its abode there, and which besides the internal havoc that it often creates in the country, threatens also to invade the European shores, and so causes the inhabitants of the latter to live in perpetual dread of such a scourge. We must however unfortunately confess that not even in this point have the medical innovations introduced into Egypt corresponded to the necessities and expectations of the promoters.

The ends to which sanitarial prescriptions should tend in countries which like Egypt contain the germ of the plague, are principally two: the first is, to destroy, if possible, the principle or vital spark of the evil, or to restrict at least as much as possible the consequence of its development: the second, to protect the country from the introduction of external pestilence. Now it is undoubted that neither of those ends has been attained by the local government through the medium of the sanitarial institutions still flourishing in that country; so that if the merit of the design or (as it is termed) of the *good intention* be abstracted, the world and the nation owe little to the promoters of those institutions.

It was only in the beginning of 1833 that the Pacha contemplated the establishment of a Sanitarial Board, the centre of which he made a so-called Consular Committee, consisting, as its name sounds, of the European Consuls accredited by his Government. The representatives of civilized nations were thought to possess an abundant store of knowledge for the utility of so important an institution; but it would have been a wiser plan to seek such knowledge, in itself *particular*, in persons of the trade; and in truth, with one or two exceptions,* the others had not the slightest idea of the topics they undertook to discuss; thus this radical defect soon ruined the work they commenced. So much the more, because to the *relative incapability* of the superiors was soon added the *absolute incapability* of the subalterns selected to fill up the various situations of the new Egyptian sanitarial *iatrarchy*.

But the height of misfortune was, that the physicians specially devoted to the Sanitarial Committee, who with their counsels might

* It is almost superfluous to observe that one of those exceptions is the Chev. and Councillor ACERBI, a man well known for his extraordinary talent and profound knowledge. Let it however be remarked, that as soon as he perceived the impossibility of attaining any useful result, he abstained from taking part in the new Consular Committee, so as to save himself from all responsibility.

have corrected and moderated, at least in a great measure, the lamentable consequences of such primary sources, were in accordance (we grieve to advert to it) with the rest of the ill-compacted edifice, and were absolutely unsuited for the high and important office they undertook.* The provisions therefore that emanated from their Committee, and were executed by their subalterns, were, we regret, seldom useful, and often noxious to the State.

To commence from what we stated to be the first scope of the sanitary discipline with regard to an *endemical* disease, nothing was done to improve the salubrity of the country, if we except the prohibition, often eluded, of interring corpses in the interior, a device undoubtedly beneficial, but insufficient by itself to cut off the intrinsic *fomites* of the evil, as was required. In a recent little work on the *Bubonic plague* of the Levant, we explained the causes to which, in our opinion, Alexandria and Lower Egypt owe their deplorable privilege of having been for ages the chosen nest of that malady, and we will readily avow that many of them are such as to surpass perhaps the limited efficacy of human remedies. Nevertheless it is undeniable, that if by a well understood system of sanitary regulations, constantly acted up to, a part at least of those causes had been obviated, the awful scourge would either have less frequently desolated the country, or its consequences would have been less disastrous. Now what has been done by the Alexandria Committee in order to achieve so beneficial a result? We have already stated, either nothing whatsoever, or too little to produce any fruit? And we might easily demonstrate it with examples, were we not disallowed by brevity from entering into minuter details. But not wishing our assertion to remain totally unproved, we will observe: 1st. That if human corpses be interred by day without the walls, the carcasses of camels, horses, asses, and of that numberless group of minor quadrupeds which at present people Egypt more than the bipeds, are shamefully allowed to rot in the inside streets and squares. 2dly. That dung, rubbish, filthy water, and similar off-scourings of the city always remain in the spot they happened to fall on, without any passage or exit to drain off from the habitations of the living—a most shocking inconvenience, that would alone suffice to render any climate naturally wholesome and pure, murderous to the last degree. 3dly. That neither the education, nor the condition of the people, properly so-called, being improved for reasons superior to the will of the Government, the dwellings or rather the huts of the Arabs continue to be real dens of wild beasts, squalid, filthy,

* Now however Signor Grassi commences to distinguish himself with repeated observations; he is the chief doctor attached to the above named Committee.

and abominable. 4thly. That the identical groups of beggars now wander through the narrow and crooked lanes of the city, destitute of ventilation, who used to stray through them before, and who are the ordinary receptacles and most fatal propagators of endemical and contagious diseases. 5thly. That the necessary government regulations regarding food are still wanting, while that which is exposed to sale is generally another abundant source of *epidemical* maladies.

Having premised these deplorable truths, passing now to the other object of sanitary regulations, namely, that of protecting the country from *foreign* pestilence, we have to lament on this point also equal, if not greater blunders, quoting as simple instances of proof, 1st. The bad construction of the Lazarettos*, and especially of that of Alexandria, the first of his Highness's, which has nothing in it commendable, whether we speak of its site, or of the minutest particulars of its interior management and medical administration—a truth that we demonstrated in a previous work, addressed to H. E. BOGHO BEY, on the 15th December 1833, and which is gradually confirmed by daily experience. 2dly. The inconsistency of repulsive measures, that are every now and then adopted, such as, for example, to permit a free ingress on the land side to persons arriving from regions actually infected with the plague, and at the same time to use rigour (we know not if more barbarous or ridiculous) with the vessels and persons that arrive on the sea-side, while they reach from the remotest places, even solely *suspected*. 3dly. The little or no exactness wherewith the sanitary orders, whether well or ill decreed, are managed: because in consequence of the deep ignorance of the sanitary officials, especially the subalterns, their indifference and want of conviction, there is scarcely ever a case in which the observance of a salutary precept is not accompanied with a greater or less violation of another equally mighty, which abundantly preponderates the utility that might have been expected from the former: thus, for example, when a disorderly gang of beastly Arab keepers are compelled to insulate an infected object, to cleanse a house, to air tainted cloths, &c., we may affirm, without fear of being deceived, that in such emergencies directed to avoid contact, the latter almost always increases in place of diminishing, as was the intent of the order.

But we should be too prolix, were we to discuss more fully this subject. The sketches we have given will suffice.

* The Lazarettos of Europe are doubtless powerful means to prevent the diffusion of *exotic maladies, originally contagious*, depending on multiplied *contact*: but those of Egypt are little serviceable for its periodical and *endemical* diseases, and much more when the Lazarettos are so shockingly situated, ill-managed, and badly laid out.

Although the collection of facts by us adduced appear to prove that the Egyptian government has recognised in principle the social importance of medicine, we grieve to be obliged to add, that the practice of this science in Egypt is still carried on destitute of any check from Government; so that now-a-days, as in those of the thickest barbarity, any body may there entitle himself *Doctor*, and be reputed such, without the superintendence of any superior authority to impede the deplorable results that may ensue. The only examination that is usually made in such matter regards the verification of the title or patents for those that aspire to any post in the Medico-military department, and this examination itself is extremely mild, much more than justice allows; but with regard to the public practice of the science, it is, we repeat, free of every obstruction. There is no necessity of inculcating how the advantages of humanity and the decorum of the medical body itself demand, that a prompt and peremptory remedy be applied to so dangerous and disgraceful an error.

European physicians actually practising in Egypt (almost all employed in the army) exceed the ordinary necessity of the country, there being about seventy, not including apothecaries, who also abound. If those persons in place of blindly and systematically professing the opinions of their Masters, belonging as they do to so many different nations, had first well studied the country, so as to modify the precepts they had imbibed, according as the variety of the climate, of the prevalent constitutional maladies, and of the dispositions and other local circumstances required, their operations would doubtless have either dissipated or moderated the various scourges that generally afflict those regions; but as all, or almost all, in place of judiciously using their preconceived opinions, through a misunderstood, and we were about adding, a censurable *esprit de corps et de nation*, continue to profess there the maxims and precepts inculcated by their respective teachers for generations,* not only widely differing, but often opposed in circumstances, it grieves us to conclude this memoir by stating, that languid humanity has not yet derived in Egypt from this medical anarchy all that aid that it undoubtedly would have received if reason had spoken in place of pertinacity and self-love. For our part, after having studied at length and with accuracy the atmospherical and physical qualities of the country and its inhabitants, we are convinced that abstinence from food, sedatives, bland refreshing purga-

* The French physicians are fanatically attached to the system of Broussais; the Italian, to that of Tomassini; the English to those of Cullen and Brown; the German, to those of Schilling and Sprengel, whose doctrine consists in magnetic, electric, and chemical processes; all discordant in practice.

tives, and proportionate blood-lettings are in general the chief remedies that are suited for Upper and Middle Egypt, for the cure of sporadic diseases that occur there, and in Lower Egypt, a *compound* method, consisting of purgatives, diaphoretics, warm baths, anthelmintics, emetics, tonics, and antiseptics.

Such are the facts that indicate the actual state of Medical science in Egypt; and we consider that they demonstrate a conclusion, which we repute undoubted, as well relative to this particular subject, as to every other branch of innovation actually attempted in that country, viz. that they are as yet but a *rough sketch*, which cannot perhaps be brought to perfection but after a long period of time, when the REFORMER PRINCE who has commenced the undertaking, and his magnanimous son, IBRAHIM Pacha,* renowned as well for his rare talent for governing as for his military qualities—when both, we say, having laid aside thoughts of war, by which they have been hitherto distracted, will exclusively dedicate their cares to the internal regime of the State, proud one day of having added a family to the illustrious circle of civilized nations.

ART. VII.—*Note on the dissection of the Arctonix Collaris, or Sand Hog. By* GEORGE EVANS, ESQ. *late Curator to the Asiatic Society.*

This curious little animal, for some time a living inmate of the Society's Rooms, having died suddenly on the night of the 20th January, apparently from the effects of cold, the following particulars of its dissection are offered to the notice of the Society.

In the length of the body it measured one foot, the head from the snout to the occiput five inches, and the tail, which is thin, straight, and pendulous, somewhat exceeded five inches.

The animal proved to be a young female, and had barely completed its second dentition. The only peculiarity worthy of notice, beyond what is already known and received, as far as regards its external organization, is a caudal pouch directly under the origin of the tail (something similar to what is found in the Badger,) but quite distinct from, and wholly unconnected with, the anus or genital organs. The sac is formed by duplicate folds of the common integuments, having a lining of naked membrane, secreting a brown unctuous matter, not unlike cerumen, or wax of the ear; the use of this peculiar structure and se-

* Eldest son of the Viceroy, born in Macedon, three miles from Cavella—a son unmatched in his obedience to his father.

cretion would appear to be confined to the generative function solely, and is most probably of an analogous nature to the lachrymal sacs in most of the Deer tribe.

The stomach was large and simple, with a strong muscular pylorus, not unlike in figure and structure that of our common Indian Bear (*U. labiatus*) on which animal I offered a few remarks at our last meeting.

The liver is divided into five distinct lobes, the second on the right side being partially separated at its lower marginal part for the reception of the gall-bladder, which contained some greenish looking bile. The kidneys differed from those of the Bears in not being lobulated. The total length of the alimentary canal from the pylorus to the anus measured eleven feet two inches. The intestines throughout were of delicate structure, and exhibited no distinct division or peculiarity of form by which the larger could be clearly distinguished from the smaller, and consequently there is no *cæcum* in this animal, or any dilatation equivalent thereto, the canal merely becoming a little more capacious in its descent towards the anal opening, where there are two small glandular follicles on its verge.

The uterus and organs of generation were too small and undeveloped to admit of examination.

Tongue large, broad, and with a soft smooth surface.

The system of dentition was as follows:

Incisors.	Canines.	False Molars.	True Molars.	
$\frac{6}{6}$	$\frac{2}{2}$	$\frac{4}{4}$	$\frac{4}{4}$	in all 32;

the Incisors, Canines, and false Molars corresponding more to the *Carnivora*, while the true Molars are tuberculous, leading to the inference that the quality of its food must be of a vegetable nature. The last Molar in the upper jaw is very remarkably lengthened, in fact it is more like the two ordinary terminal teeth united into one than a single tooth, but this is not the case with the corresponding tooth in the lower jaw.

The diet of the animal while in captivity consisted entirely of bread, milk, and plantains; the latter being evidently its favorite food, to the total rejection of meat and flesh of all kinds.

There were no morbid appearances observable on opening the body to account for its sudden death; this coupled with the circumstance of the animal having up to the time of its demise been in perfectly good health, and appearing in fine condition on dissection, leads me to conclude it must have perished from exposure to cold.

It has been remarked by some naturalists that this obscure and anomalous animal is closely allied to the Bears and Pigs, forming a

bond of union, or kind of link, connecting the extreme limits of the *Carnivora* with the omnivorous *Pachydermata*, but I do not clearly trace the connection here said to exist. That it shows some very marked affinities to the Bears cannot be denied, and which are prominently displayed in its perfectly plantigrade motion, by the form and structure of the foot, and by some of its habits; but where the connection said to exist between it and the Pigs, beyond a mere accidental resemblance of its head to that animal is to be found, I am at a loss to conceive. If an analogy is to be traced, I should certainly say that in general appearance and physiology it is far more like the Badger than any other animal it has been compared to, and its approximation to it is made apparent by its kindred habits, dentition, and other structural peculiarities, possessing like the Badgers the caudal pouch, and wanting, like them, a true *cæcum*, which its dissection has pointed out. In short, I incline to consider it an aberrant form of Mole leading directly into the Ursine group, rather than taking an intermediate place between the Bears and the *Pachydermatous* family, to which last it appears from the above dissection to have little or no affinity.

The importance of making anatomical organization the basis of systematic arrangement, as promulgated by Cuvier in his great work the *Regne Animal*, cannot be too forcibly insisted on; it is the only sure and safe guide to a correct analysis of genera and species, and where opportunities present themselves for these investigations they should never be lost sight of, while their results, however uninviting they may appear, should be duly noted and recorded as facts for the information of the systematic naturalist and inquirer after nature.

P. S.—Since writing the above I have met with a delineation and description of an animal by Bewick (Hist. Quad. 4th edit, Newcastle upon Tyne 1800, page 284) called the "Sand Bear," in which he notices the name of "*Sow Badger*" as one of its appellations. The specimen from which his drawing was made belonged to the Tower of London Menagerie. He also quotes a white Badger (described by Brisson) as a native of New York, and believed to be of the same species. From the above quoted drawing of Bewick it is clear that the animal was known to English naturalists long before M. Duvaucel's description had appeared; and I record the fact in order to wipe away a portion of that reproach so frequently cast upon our countrymen, of allowing foreigners the honor of having anticipated us in the wide extended field of Eastern Natural History to which we have such ready access; and which reproach I am convinced (with as much support as is afforded by the Governments of other European Powers to similar objects,) would never have been either deserved or incurred.

Art. VIII.—*On the Cultivation of Roses and the Manufacture of Rose Water and Utur at Ghazeepore.*

We are indebted to Dr. Jackson, Civil Surgeon at Ghazeepore, for the subjoined very interesting note on the celebrated Rose trade of that district. The information was sought for, for a work now in progress on "Indian Materia Medica"; meanwhile we have much pleasure in giving publicity in this Journal to the curious facts Dr. Jackson has collected.—Eds.

I have now the pleasure of sending you the information you require on the manufacture and trade of Rose-water in this district. Ghazeepore seems to have been long famed for its Attar and Rose-water, and having got the name, it has done its best to preserve it. The cultivation of the Rose plant is sufficient to supply the demand, and as the average remuneration is not more than enough to compensate for the trouble of its culture, no competition from the adjoining districts has been made.

Around the station of Ghazeepore there are about 300 beegahs, or about 150 acres, of ground laid out in small detached fields as Rose gardens, most carefully protected on all sides by high mud walls and prickly pear fences, to keep out the cattle. These lands, which belong to Zemindars, are planted with Rose trees, and are annually let out at so much per beegah for the ground, and so much additional for the Rose plants—generally five rupees per beegah, and twenty-five rupees for the Rose trees, of which there are 1000 in each beegah. The additional expense for cultivation would be about 8/8; so that for rupees 30/8 you have for the season one beegah of 1000 Rose trees.

If the season is good this beegah of 1000 Rose trees should yield one lac of Roses. Purchases for Roses are always made at so much per lac. The price of course varies according to the year, and will average from 40 to 70 rupees. During the past season the latter was the price given for one lac of Roses towards the conclusion.

As soon as the Roses come into flower the Zemindars and cultivators of the Rose gardens, as well as intending purchasers, meet in the city, and according to the demand and expected produce, a *nerick* is established, and purchasers then enter into agreement with the cultivators for so many lacs of Roses at such a price. This agreement is considered binding, and the cultivator is obliged to deliver the quantity at the contract rate; when that is completed another can be made, but this latter is always at a much higher rate.

The Rose trees come into flower at the beginning of March and continue so through April. In the morning early the flowers are plucked

by numbers of men, women, and children, and are conveyed in large bags to the several contracting parties for distillation. The cultivators themselves very rarely manufacture.

The native apparatus for distilling the Rose-water is of the simplest construction; it consists of a large copper or iron boiler well tinned, capable of holding from eight to twelve gallons, (shaped like the earthen hoondahs in which the Gomastahs send in their Opium) having a large body with a rather narrow neck, and a mouth about eight inches in diameter; on the top of this is fixed the head of the still, which is nothing more than an old *dekchee*, or cooking vessel, with a hole in the centre to receive the tube or worm.

This tube is composed of two pieces of bamboo, fastened at an acute angle, and it is covered the whole length with a strong binding of corded string, over which is a luting of earth to prevent the vapour from escaping. The small end, about two feet long, is fixed into the hole in the centre of the head, where it is well luted with flour and water. The lower arm or end of the tube is carried down into a long necked vessel or receiver, called a *bhubka*. This is placed in a handee of water which as it gets hot is changed. The head of the still is luted on to the body, and the long arm of the tube in the *bhubka* is also well provided with a cushion of cloth, so as to keep in all vapour. The boiler is let into an earthen furnace, and the whole is ready for operation.

There is such a variety of Rose-water manufactured in the bazar, and so much that bears the name, which is nothing more than a mixture of sandal oil, that it is impossible to lay down the plan which is adopted. The best Rose-water however in the bazar may be computed as bearing the proportion of one thousand Roses to a seer of water; this perhaps may be considered as the best procurable. From one thousand Roses most generally a seer and a half of Rose-water is distilled, and perhaps from this even the Attar has been removed.

The boiler of the still will hold from eight to twelve or sixteen thousand Roses. On eight thousand Roses from ten to eleven seers of water will be placed, and eight seers of Rose water will be distilled. This after distillation is placed in a carboy of glass, and is exposed to the sun for several days to become *puckah*; it is then stopped with cotton, and has a covering of moist clay put over it; this becoming hard effectually prevents the scent from escaping. The price of this will be from twelve to sixteen rupees. This is the best that can be procured.

To procure the Attar, the Roses are put into the still, and the water passes over gradually as in the Rose-water process; after the whole has come over, the Rose-water is placed in a large metal basin,

which is covered with wetted muslin tied over to prevent insects or dust getting into it; this vessel is let into the ground about two feet, which has been previously wetted with water, and it is allowed to remain quiet during the whole night. The Attar is always made at the beginning of the season when the nights are cool; in the morning early the little film of Attar which is formed upon the surface of the Rose-water during the night is removed by means of a feather, and it is then carefully placed in a small phial; and day after day as the collection is made it is placed for a short period in the sun, and after a sufficient quantity has been procured it is poured off clear, and of the colour of amber, into small phials. Pure Attar when it has been removed only three or four days has a pale greenish hue, by keeping it loses this, and in a few weeks time it becomes of a pale yellow. The first few days' distillation does not produce such fine Attar as comes off afterwards, in consequence of the dust or little particles of dirt in the still and the tube being mixed with it. This is readily separated from its sinking to the bottom of the Attar, which melts at a temperature of 84°. From one lac of Roses it is generally calculated that 180 grains, or one tolah, of Attar can be procured; more than this can be obtained if the Roses are full sized, and the nights cold to allow of the congelation. The Attar purchased in the bazar is generally adulterated, mixed with sandal oil or sweet oil; not even the richest native will give the price at which the purest Attar alone can be obtained, and the purest Attar that is made is sold only to Europeans. During the past year it has been selling from 80 to 90 rupees the tolah; the year before it might have been purchased for 50 rupees. Native stills are let out at so much per day or week, and it frequently occurs that the residents prepare some Rose-water for their own use as a present to their friends, to secure their being provided with that which is the best. The natives never remove the calices of the Rose flowers, but place the whole into the still as it comes from the gardens.

The best plan appears to me to have this removed, as by this means the Rose-water may be preserved a longer time, and is not spoiled by the acid smell occasionally met with in the native Rose-water. It is usual to calculate 100 bottles to one lac of Roses. The Rose-water should always be twice distilled; over ten thousand Roses water may be put to allow of sixteen or twenty bottles coming out; the following day these twenty bottles are placed over eight thousand more Roses, and about eighteen bottles of Rose-water are distilled. This may be considered the best to be met with. The Attar is so much lighter than the Rose-water, that previous to use it is better to expose the Rose-water to the sun for a few days, to allow of its being well mixed,

and Rose-water that has been kept six months is always better than that which has recently been made.

At the commencement of the Rose season, people from all parts come to make their purchases, and very large quantities are prepared and sold. There are about thirty-six places in the city of Ghazeepore where Rose-water is distilled. These people generally put a large quantity of sandal oil into the receiver, the oil is afterwards carefully removed and sold as Sandal Attar, and the water put into carboys and disposed of as Rose-water. At the time of sale a few drops of sandal oil are placed on the neck of the carboy to give it a fresh scent, and to many of the natives it appears perfectly immaterial whether the scent arises solely from the sandal oil or from the Roses; large quantities of sandal oil are every year brought up from the south and expended in this way.

The chief use the natives appear to make of the Rose-water or the Sandal Attar as they term it, is at the period of their festivals and weddings. It is then distributed largely to the guests as they arrive, and sprinkled in profusion in the apartments. A large quantity of Rose-water is sold at Benares, and many of the native Rajahs send over to Ghazeepore for its purchase. Most of the Rose-water as soon as distilled is taken away, and after six months from the termination of the manufacture there are not more than four or five places where it is to be met with.

I should consider that the value of the Roses sold for the manufacture of Rose-water may be estimated at 15,000 rupees a year, and from this to 20,000, and from the usual price asked for the Rose-water and for which it is sold, I should consider there is a profit of 40,000 rupees. The natives are very fond of using the Rose-water as medicine or as a vehicle for other mixtures, and they consume a good deal of the petals for the conserve of Roses, or *Goolcund*, as they call it. There are several kinds of essential oils produced from the strong scented flowers in this district, which I will procure and send down to you.

ART. IX.—*Memoranda on the Museum of the Asiatic Society. By* DR. M'CLELLAND.

A Museum may be considered in the light of a philosophical book, in which language is represented by works of nature and art. If system be important in common undertakings, in a Museum it is every thing; and not only should every object be placed according to the position it occupies in the history of art, or in the system of nature, but the very apartments in which the collections are placed, and the cabinets, and even the glasses in which they are contained, should be conformable to some general plan, as much as possible in imitation of the simplicity of nature. To be able to adopt a plan, requires that we should have something to work upon; and in proposing a plan for the guidance of future operations in the Museum, we cannot be too grateful to those who have by their exertions, within a comparatively short space of time, put us in possession of our present instructive and respectable collections.

To Captain Herbert and Mr. Calder we are not only indebted for extensive geological and mineralogical collections, but as being among the first contributors to the Society's collection of natural objects, which may be said to have commenced in 1828 with the revival of the Physical Committee.

Although a brief space of ten years has only elapsed since our Museum of Natural History was first formed, yet more changes have taken place in that short period among those who have taken an active part in its management, than in any similar European establishment in half a century.

This is one reason why a set of rules should be adopted by which the steady advancement of the Museum may be secured; and another reason for such rules, is the growing importance of the collection itself; which requires on the part of the Society a stricter surveillance over the establishment entrusted with its management than formerly.

Before proposing rules it is necessary to explain the different purposes they are required to answer.

On the subject of Cabinets, it is necessary that they should be chosen with strict attention to the appearance and convenience of the Museum. They should be of two kinds, namely, glass cases for walls, and tables with glazed covers for the centre of the rooms, of the pattern proposed by Mr. Jameson, in imitation of the Edinburgh Museum.

The first description of cases fitted up with shelves will answer for

birds, fishes, and the smaller reptiles and mammalia which may be disposed of along the walls. The second description of cabinets will answer equally for shells, insects, rocks, minerals, and fossils. Thus every object for which a cabinet is likely to be required may find a place in one of the two sorts, to which it is proposed to confine the furniture of the Museum.

That an unnecessary variety in the form of cabinetsdestroys the uniformity of the Museum, and that lofty cabinets placed in the middle of the apartments, as at present, convey a sense of closeness and prevent the use of punkas, so essential in this climate, any one who has paid a visit to the Museum must see.

Indeed, without the strictest attention to some general plan in the fitting up of a Museum, it must appear to persons of taste rather as any thing rather than a place of science. Of all our cabinets, those only in which the perching birds have been placed on shelves by Mr. Jameson ought to be retained longer than it may be convenient to the Society to replace them. Twelve glazed tables of the pattern already alluded to, each nine feet in length, ought to be provided. These would admit of all the rocks and minerals, as well as fossils, which constitute an important portion of the Society's collection, being brought forward and exhibited. Even if twelve tables should prove too many for this object, the spare ones would be ready for the reception of such new collections of interest as might be sent to us in any of the numerous departments for which such tables are intended.

The next subject to consider is the nomenclature of the Museum. It is necessary, for various reasons, that this should not altogether rest on the authority of the Curator. There is a plan which with a little regularity in its execution, will place this very important object on the best possible footing, and at the same time afford to our Museum something more than local interest. Let every species be numbered, and all duplicates be numbered so as to correspond with the species to which they belong in the regular collection.* After retaining a perfect series or two let duplicates or triplicates be forwarded on the part of the Society to individuals eminent in particular branches of science, re-

* There are now in the Museum some hundreds of duplicate skins of birds, some of which appear to have been intended for the East India Company's Museum; these may be all numbered so as to correspond with our own collection, and figured lists transmitted with them to the India House, soliciting that such lists may be returned to the Society with the correct nomenclature inserted opposite to the figures. Anticipating no objection to this, I have already numbered most of the birds in the Society's collection, and have ordered corresponding numbers to be attached to those intended for the Honorable Court.

questing that lists may be returned to the Society with the scientific names inserted opposite to the corresponding numbers, from such lists the names may then be transferred to the objects in the Museum. We should thus not only secure a perfect nomenclature, but at the same time disseminate a knowledge of the productions of India, and give a publicity to the contents of our collection far more important to the advancement of science than could be effected by any other means.

On the establishments of the Museum as they relate to expenditure, I am incompetent to offer any suggestions. It appears from the pecuniary accounts published in the January number of the Journal, that the Museum expenses in 1838 exceeded the Government grant of 200 Rupees per mensem by 1171 Rupees, although 246 Rupees only of that excess appears to be set down for cabinets. During the present year if the requisite cabinets be procured, and the other expenses of the Museum be continued as before, the excess beyond the Government grant for the support of the Museum, will necessarily amount to several thousand rupees.

The persons employed in the Museum at present are—two taxidermists, one on the receipt of 50 and the other 12 Rupees per mensem; two carpenters at 8 Rupees each; and two native servants; whose salaries altogether amount to 88 Rupees per mensem.

The principal taxidermist cannot write, and as he is therefore incapable of keeping any record, it would be necessary to have some one else on the spot to wait on visitors, and assist in carrying on the business of the Museum. In the Library there is an assistant librarian who has been employed for several years on a salary of 30 Rupees a month, it would be necessary that his duties should be extended to the Museum, and that his salary should be raised, say from 30 to 50, or 60 Rupees a month, which would still leave a balance of 70 or 80 a month for petty expenses, so that the Government grant would thus just meet the current expenses of the Museum, exclusive of cabinets and Curator's salary.

If we have a Museum, we must have cabinets; the salary of a Curator is not however considered so essential, and some of the members of the Society have already protested against such an expenditure.

In proposing that the office should be an honorary one, I am guided entirely by what I conceive would be the sentiments of all votaries of science, without any affectation of disinterestedness on my own part. Indeed under any circumstances I could not undertake to hold the office of Curator longer than the plans here proposed should be placed in proper training, after which, the whole might be conducted by a subordinate establishment under the direction of the Committee of

Papers; a more efficient subordinate establishment might be provided for the Museum; the increased value and extent of the collections seem to me to require more than two native servants, while the carpenters might be exchanged for collectors. If native collectors, on a monthly salary of 6 Rupees each be properly attended to and trained, they would soon put us in possession of most of the insects, fishes, and *crustacea* of Bengal, and all such persons, as well as those employed in the Museum, might be placed under the immediate direction of a well educated youth from one of the public schools. It would be necessary that such a person should be well recommended not only for general acquirements, but also for his taste in Natural History; the latter taste of course we could only expect to find in any youth from a Calcutta Seminary, on the *non fit sed nascetur* principle.

After providing all that is necessary in the way of cabinets, collectors, and efficient establishments for conducting the duties of the Museum, if the funds of the Society should still allow of a specific sum being set apart for the remuneration of a Curator so much the better, although I must confess I should rather see him in circumstances that would render pecuniary remuneration from his colleagues unnecessary. As however it some times happens that science and fortune do not go hand in hand, a nominal salary of 30 Rupees a month might be assigned to the office of Curator. It will be for the Committee of Finance to determine whether after providing for the increased expenses attending our augmented collections, a larger sum can consistently with the receipts of the Society be paid for the object in question.

From the above remarks we may deduce the following rules, which appear to embrace all that is necessary to secure the progressive advancement of the Museum:—

1. The direction of the Museum to be entrusted to the Committee of Papers, and its duties superintended by a scientific individual appointed by the Society on the nomination of the Committee.
2. Although the office of Curator is held to be one of distinction, an allowance of 30 Rupees per mensem is granted by the Society, to be drawn or not according as the Curator may feel inclined.
3. That the subordinate establishments in the Museum shall consist, if possible, of two well educated Europeans* or Natives of India, on a salary of not less than 50 and 12 Rupees per month respectively.
4. That the number and occupation of other servants in the Museum shall vary according to circumstances.

* This is not intended to interfere with the persons already employed in the Museum.

5. That only two descriptions of cabinets are to be admitted into the Museum, namely, glass cases of one uniform pattern for the reception of birds, small quadrupeds and the like, which are to be placed along the walls; and, tables with glass covers of an uniform pattern for the reception of shells, insects, fossils requiring cabinets, geological specimens, and minerals; to be placed along the centre of the apartments.
6. That all objects in the Museum be numbered and entered in Museum books to be provided for the purpose, and that duplicates of birds, shells, insects, and the like, be from time to time transmitted on the part of the Society, with figured lists, names of original donors, &c. to such eminent scientific individuals as may seem most likely to afford correct information regarding them, and who should be requested to return the lists with the names and references inserted opposite each figure or number.
7. That all such communications are to be regularly entered in Museum books, together with such replies as may be received on the subject.

June 4th, 1839.

ART. X.—*Observations on the "Report on the Museum of the Asiatic Society, by* DR. WM. JAMESON," *published in the Journal for March*, 1839. *By* J. T. PEARSON, *Assistant Surgeon, formerly Curator of the Museum of the Asiatic Society.*

To the Secretaries to the Asiatic Society.

GENTLEMEN—A paper by Dr. Wm. Jameson, entitled a "Report on the Museum of the Asiatic Society" having appeared in your Journal for March last, reached me to day; and as it appears to contain reflections upon my conduct while Curator of the Society's Museum; and recommendations, which if I had not made I should have neglected, or been ignorant, of my duty; I request you will do me the favour to lay before the Society the following observations. I perceive you went out of your usual course to give the "earliest publicity" to what you deem Dr. Jameson's "very important" paper; and, therefore, I trust you will do me the justice to publish my reply in the next number of your Journal.

Dr. Jameson begins by stating his disinclination to report upon the state of the Society's Museum, lest he might be considered as "attacking the proceedings of his predecessors." A very proper feeling, but

which, having overcome, he should not have allowed to retain such influence over his report, as to induce him to conceal the names of those, his predecessors, he thought fit to censure. For my part, I wish he had been more explicit, both for his own sake and for mine; for hints and insinuations are difficult for me to deal with; while they leave him open to a suspicion of being one of those who are

> "Willing to wound, and yet afraid to strike;"
> "Just hint a fault, and hesitate dislike"—

a character, which I should be very sorry did I really think him to merit.

However lest I should be accused of appropriating to myself blame intended for another, conscious of deserving it; I must refer to what was said by Dr. M'Clelland (from whom of all men I least expected an attack) at a late meeting of the Society. Dr. Jameson might easily err from ignorance; Dr. M'Clelland could scarcely do so;—the former possibly never heard much more of me than my name, still less the precise part I took in the management of the Museum; the latter was aware I was one of those predecessors of Dr. Jameson he took precedence to censure*; though, as he did not know the state of the collection of Natural History when I took charge (for I believe he had at that time never seen it) I know not how he can justify his bold comparison.

Dr. Jameson first notices the "*minerals*" and "*rocks,*" and comments in severe terms upon the state in which he found, and left them. With this I have nothing to do. The mineralogical and geological (organic and inorganic) departments were never committed to my care. Mr. James Prinsep kept them in his own hands; and, in justice to him, I beg to say, that although from want of cabinets he could not arrange them; there was, so far as I remember, none of that confusion and damage Dr. Jameson so forcibly bewails. Certainly they were packed in drawers, but they were well known to Mr. Prinsep. I believe most, if not all of consequence, of them, were labelled; and the destruction spoken of is far more likely to have happened in their transmission to the Society, than in their quiet dormitories in the Society's rooms. At all events, as aforesaid, I had nothing to do with the mineralogy, nor geology either.† The zoology was my branch of the

* Sic. in M. S.—EDS.

† I do not know the arrangements made with Mr. Evans; but I believe he had charge only of the zoological part of the Museum, and consequently was as innocent of the mismanagement (if any) of the "minerals and rocks" as myself. I think this due to an absent man. Lieut Kittoe's proceedings I know still less of; but he, as well as the Museum Committee, are here to answer for themselves.

Museum; for this, *as I left it*,* I am answerable, and to Dr. Jameson's notes upon it I shall briefly reply, in the order of his remarks.

Mammalia.—Dr. Jameson states that "many of the specimens of *Mammalia* are exceedingly good; but others, from their bad condition, require to be replaced as soon as possible." I believe the good specimens are for the most part those procured and set up either by myself or under my superintendence. The bad ones are what were in the Museum before I took charge, and were in a most miserable state, as may be seen from my first annual Report. I left them in the Museum only till better could be procured, on the principle that a bad specimen is better than none.

Birds.—Of the 600 birds mentioned by Dr. Jameson, about 360 were procured and prepared by my exertions—many of them shot by myself; of the rest I err but little if I say, the greater part would never have reached the Society's Museum, if I had not taken measures, hereafter to be mentioned, for their collection. Of those prepared in my time I have copious notes, and the greater portion of a catalogue made, which is enriched by observations on the manners and habits of the Indian birds by Mr. C. W. Smith. This I did intend to finish, so soon as I could get a little respite from the incessant occupation incidental to the wandering and anxious life I have led since I left Calcutta, would allow; and I shall be happy to do so as soon as possible, if the Society wish it. In the enumeration of new and rare specimens Dr. Jameson omits the newest and rarest of them all, viz. the *Halcyon amauropterus, mihi*, which I discovered, and the *Eurimrynchus griseus*, of which but one other specimen is known.†

* I say *as I left it*, because the Editors of the Journal in a note appended to Dr. Jameson's Report say, that since his departure, short as the time has been, the minerals he arranged have been "swept into chaos by the unguarded hands of *Assistants*." As nearly two years have elapsed since I was Curator, during which the Museum had been in charge of a Committee and two Curators before Dr. Jameson; surely some allowance might have been made for Dr. Jameson's "predecessors" on the same score; especially as from the utter failure of the Committee to fulfil the office properly, the whole management was probably left in their time to the "unguarded hands of *Assistants*" only. I think the excuse might have been made for us; not I trust that I need it, but in common fairness.

† As every one with any pretensions to ornithological knowledge is acquainted with the rareness of this bird, I fear from Dr. Jameson's silence, it has been lost to, or abstracted from, the Museum. I hope the Secretaries will inquire into this; for it is unquestionably the most valuable ornithological specimen we have. (1)

(1) Dr. Pearson's note.—We have made the suggested inquiry of Dr. M'Clelland, who replies thus,

"The Museum is at present in such confusion owing to the repairs of the house, that it is impossible to say what is in it, and besides all the tickets have fallen off the birds from damp, as they appear to have been merely fastened with glue."—Eds.

Osteology.—The osteological department is well spoken of by Dr. Jameson. The skeletons he praises were nearly, if not quite, all procured and articulated under my directions. And those who know by actual practice, the trouble of preparing bones of a skeleton; and afterwards the manual labour, and anatomical and mechanical skill requisite to articulate them, will not be disposed to censure me, or withhold their praise from my industrious and willing assistant M. Bouchez; for the value of who's services I am pleased at having another opportunity of recording my thanks.

Ichthyological, Erpetological, Conchological, &c. Departments.—As Dr. Jameson says nothing about these, I shall follow his example, except to observe, that the want of bottles, and means to arrange the specimens, placed them in nearly the same condition as that of the minerals; that I procured most of them; the land and fresh water shells of India in particular were chiefly from my own collection, and so were the insects, except a few presented by Dr. M'Clelland, and one or two other individuals, and some from Chirra Poonjee and Sylhet, which I purchased.

With regard to Dr. Jameson's suggestions—I have to observe, that fitting up the bird-cases with shelves, is doubtless an alteration, but no improvement upon the plan I adopted. Shelves in high cases, like the Society's, obstruct the view of the specimens and darken the cases; and for these reasons I removed them. By my plan the specimens could be systematically arranged, and were so; and in my opinion it admitted of far more being placed in a given space than the shelving system. As to the classification of the birds, I followed that of Vigors, as given in the Zoological Journals, and Stephens' and Shaw's Zoology as being simple, easy of access to common readers, and highly approved of by eminent zoologists. No doubt it has faults, but it is the system (perhaps I should say *method*) best adapted to a Museum where the majority of members are not professed ornithologists; and to change it for that of Cuvier, the chief merit of which is being part of a general systematic work, is I submit, another instance of an alteration being no improvement.

Dr. Jameson next suggests that the cases should be made "air tight by lining the edges of the doors with shamois leather, poisoned with arsenic." I fully agree with him that specimens of Natural History can be preserved here, and I will go further than he does, and say, they can be preserved here not only almost, but quite as well as they can be in Europe; but not by the means he points out. As for making a case air-tight, the thing is impossible; but it may be made tight enough to become continually damp within—a rather curious mode of preserving the specimens. Years

ago I pointed out to the Society, and practised, with complete success, the plan I suggested of keeping the cases open as much as possible, particularly in fine weather. When specimens are well aired, and the pernicious practice of shutting them up in tight cases is abandoned, they can be kept as well in Bengal as in England. I had some in my private collections which I prepared seven years before, and in so perfect a state as not to have lost a feather;* and I venture to assert that no one while the Museum was under my charge ever saw one of the specimens prepared from fresh birds, either in a decayed or damaged state. In fact, nothing will keep in a damp climate unless frequently aired, whether animal or vegetable specimens, stationery or linen, silks or satins, pack them in tin and air-tight boxes how we may,—a fact which will be borne testimony to by every old lady in Bengal.

Again with regard to Dr. Jameson's "*desiderata*;"—I regret that neither he himself, nor any of his friends, consulted the Journal, or inquired what had been done by those predecessors he assumes to be so worthy of censure. Had he done so, he would have found, that I did "get up under the auspices of the Society" the instructions or "memorial" as he terms it, (which forms the first of his list of "desiderata") giving brief instructions how to collect, prepare, and pack objects of Natural History; and that it was extensively circulated both by Mr. Prinsep and myself. This memorandum, moreover, was followed by a very long paper of no less than ten closely printed pages in the number of August 1835, of the Journal of the Asiatic Society; in which were detailed the plans followed by the best taxidermists in Europe, and the result of my own experience of eight years in this country. A further experience of four years has given me but little to add; so I think the Society cannot do better than re-print and circulate that paper. I shall be happy to make a few alterations in, and additions to it, and Dr. Jameson will perhaps favour us with his remarks, or some account of such methods as may have been recently brought into notice in Europe; while Dr. M'Clelland can append a list of specimens required by the Society. When my paper was written every thing was welcome, and consequently no such list appended. These papers were eminently successful; great numbers of specimens having been sent in soon after their having been circulated: probably copies of the shorter one are still in the Secretary's office.

* For this see the *Felis kutas, mihi*, in the Society's Museum, which I mounted in December 1831; and when I left Calcutta in 1837, nearly six years afterwards, its preservation was so perfect, that though a heavy specimen, I lifted it up by the hair of the back without injury. I need scarcely say it had never been shut up in an air-tight case.

I believe I have now replied to the zoological part of Dr. Jameson's observations, and shewn—First, that the censure he bestows does not belong to me; secondly, that those parts of the Museum he praises were especially under my care; and, thirdly, that his suggestions for the improvement of the zoological department of the Museum are either pernicious, or have been anticipated years ago. I shall now proceed to state what I did while I held the office of Curator, so that he, or any body else who feels disposed to the work, may deal out upon me the censure he may consider me to merit; for, as I wish not to usurp credit which does not belong to me, I am not any longer inclined to be under imputations of misconduct and neglect, for the errors and omissions of others.

I think it was so early as the year 1830 that I proposed to Sir E. Ryan, then, as now, the most disinterested lover of science in the Society, the establishment of a Museum of Natural History for the Asiatic Society. I was at that time at Midnapore, and the suggestion, though favoured with his support, was too much in advance of the feelings of the day, almost exclusively confined to the love of Oriental literature. On removing to Calcutta in 1832, I proposed the matter to the Society at large; but nothing could be done till July 1833, when I was appointed, much against my will, honorary Curator of the Museum of Natural History. This I nominally held till March 1835, and it was but nominally, to please Mr. Prinsep, and against my own wishes and judgment; for no assistance was given me. I could but ill afford to keep up additional expenses to convey me to the Museum; and more than all, I felt that my circumstances were then such as not to warrant my so giving up time, which I ought to employ to the benefit of my family; therefore I resigned the situation, and proposed, that a person properly qualified should be sent for from Europe, to fill it. The subject was hereupon referred to the Committee of Papers (as it is reported in the Journal of the Asiatic Society, but as I think, to a Sub-Committee) for the purpose of considering the question. This Committee consulted Baron Hugel, and the majority agreed that for various reasons, stated in their report, it would be better to employ a Curator already in the country, whose services could be procured at less cost, and devote part of the sum proposed, for the contingent expenses. To this the Society agreed, and I was elected Curator in April 1835, as an experiment for one year.

When I took charge of the Museum no order nor arrangement had been observed; specimens of the arts and sciences of India, and the neighboring countries, of their religion and manufactures, antique and modern, were mixed with those of Natural History in abundant

confusion. The cases were dirty, and falling to pieces, with wooden doors; the rooms damp; and the specimens decaying. All this was reduced to order. In the words of my first annual report—"The first step was to divide the Museum into two distinct parts; one consisting of the works of art;* the other, of the productions of nature. The numerous valuable specimens of the former being lost in the rooms below, were removed into the entrance hall, staircase, and gallery, where they now are, and where they are seen, as we all know, to the greatest advantage; and their removal allowed of the apartments they occupied being entirely devoted to the Natural History portion of the Museum.

"On examination, the specimens of Natural History were found, for the most part, in a very neglected state. In Osteology they were numerous, and some of these very valuable; but many were more or less mutilated, and the teeth of the skulls lost, while no catalogue, nor even memorandum of the greater portion could be found. The first care was to remedy this: the broken specimens were repaired, so far as they could be repaired; and a catalogue was made which includes every thing concerning them that can be gleaned from the Researches and other quarters, whether as to the specimens themselves, or the names of the donors. In making this catalogue some difficulty was experienced from the want of any notices of the specimens, and from there being no objects of comparison, by which to discover the species of an animal, of which we had perhaps but a horn, or a single bone.

"While this was going on, attention was also directed to the formation of a cabinet of reference to compare the fossil remains in which the Museum is so rich with the living congeners of the animals to which they belonged. This is in its very nature a tedious and laborious work; but already there have been articulated, and set up, skeletons of a Monkey, Weasel, Cat, Rat, Musk-deer, Horse, Parrot, and Tortoise. The Rhinoceros, which was before but badly put together, has been made the most of that its condition would allow; and an Elephant's skeleton,* and those of another Horse and Tortoise are being prepared. As this branch of the Museum is of the greatest importance, I am anxious to render it as complete as possible; and with this view have written to various individuals likely to further our object, who have promised the bones of the Camel, wild Buffalo, large Deer of various kinds, the large Bullock of Upper India, the Tapir, and the Alligator; and we may expect soon to receive them."

But for full information I beg to refer to the report, which was pub-

* This was afterwards found unfit for articulation, and I procured another.

lished in the Journal of the Asiatic Society for April 1836; where it will be seen that in one year the Museum put on a different aspect from what it presented when I took charge. The damp was got rid of; most of the cases were altered and repaired; the decayed specimens were restored as far as possible; an Osteological catalogue was made; that of the Birds began; nine complete skeletons were articulated; twelve specimens of *Mammalia*, and 133 birds were mounted, and more than 500 specimens of *Vertebrata*; 150 *Molusca*, some *Crustacea*, and several hundred insects were added to the Museum; and the Committee was so well satisfied with my exertions as to resolve—"That the Committee are highly pleased with the arrangements adopted by Dr. Pearson in the Museum, and with the progress it has made under his supervision; and they have no hesitation in recommending to the Society a continuation of the same system which has proved so beneficial and effective during the experimental year."*

My copy of the Journal for the first months of 1837 was lost in a boat on the Ganges, and I have but a draft copy of my report for that year. But from this I learn that in the second year, the arrangements of the last year were followed out by improving the appearance of the apartments by matting the rooms; while by free ventilation the damp, from which so much inconvenience was formerly experienced, altogether disappeared. The remainder of the cabinets, save one, were glazed, and made ready for specimens; and subscriptions were set on foot for adding to them. There were mounted in the Museum, twenty-eight specimens of *Mammalia*, two hundred and thirty birds—ten of large size; and sixteen reptiles; and eight skeletons were prepared and articulated. Besides these there were presented twenty-eight osteological specimens. Most of the reptiles, the fishes, and invertebrated animals are not enumerated in my draft of the report; but I believe they amounted to several hundred specimens.

Thus in two years there were prepared by myself and under my superintendence,

17 Articulated Skeletons,
363 Mounted Birds,
40 Mounted *Mammalia*,

and a large collection was made, principally by myself and my own servants, of other vertebrated and invertebrated animals. The skeletons of all the large *Mammalia* we have were thus procured. Those of the Orang-Outang, Monkey, Weasel, Cat, Rat, Musk-deer, Cow, Horse, Ass, Hog, Rhinoceros, Parrot, Adjutant, Tortoises, &c., were procured

* Journal of the Asiatic Society, April 1836, page 253.

entirely by my exertions. When the Orang-Outang* died its owner directed the skin to be tanned, and the carcase thrown away. As I had long had my eye upon it, I soon found out what had been done, hastened to the owner, and by recovering the greater part of the bones (all save a few of the feet, I think) had the pleasure of setting up in the Museum one of the most valuable skeletons in the world. The carcase of the Rhinoceros was sent to Dr. Grant by Mr. J. H. Barlow, who shot him; Dr. Grant gave it to me, and I presented it, with his consent, to the Society in Mr. Barlow's name. In fact I procured all these specimens by my own exertions (for there was not one in the Museum when I became Curator) as well as the skeleton of the Elephant, which was about being articulated when I gave up the office.

Besides these things I maintained at my own expense an extensive correspondence with various individuals to induce them to send specimens to the Museum; and represented to the members of the Government, with an urgency which I fear was sometimes thought scarcely becoming, the importance of expeditions undertaken into countries but little known, being accompanied by persons qualified to make zoological collections. For instance, I represented to Sir C. Metcalfe, that the attention of the Assam Tea expedition should be directed as much as possible to this object, and I believe it was in consequence of this recommendation, that any zoological collections were made in that expedition. I did the same when Dr. Richardson's expedition into the Shan country was contemplated; and I have reason to believe he would have been accompanied by an officer expressly for this purpose, had he not set out sooner than was expected. In short, I can safely say, I lost no opportunity of acquiring specimens for the Museum, and of advancing zoological knowledge. All this was not done in a corner; but is well known to the President, to some of the Vice-Presidents, and to the Members of the Committee of Papers of the day. And it was done too at a time when an up-hill battle had to be fought. No Government allowance was then given to the Society; and a great number of the members of most influence were opposed to spending their money on a Museum of Natural History. Indeed so begrudgingly were the necessary expenses bestowed, that I had both years to advance money, every month, for contingent expenses, at my own risk, while I paid the salary of young Nicholas, M. Bouchez's nephew, out of my own pocket, and thus brought him up as another valuable Assistant in

* Though here called an Orang-Outang, for want of a name which an English reader can well understand, I believe the specimen to be the female of the *Simia Satyrus*, the Gigantic Ape shot by Capt. Cornefoot in Sumatra, which was described in the Researches, and whose jaw bone is in the Museum.

the Museum. I beg not to be misunderstood as assuming any merit for these things; it was my duty to do them, and it is to shew I did not neglect my duty, that I venture to mention them.

With regard to catalogues, it was no use to prepare one of the *Invertebrata* till a collection could be made worthy of a catalogue being prepared; nor of the *Vertebrata*, which could not be displayed. But of the former the shells were all fixed upon ebony boards, and labelled with their names and locality—a measure which obviated the necessity for a catalogue, and rendered the making one an easy matter; while of the latter, I both labelled and made a catalogue of the osteological specimens, collecting, at no little pains, all the information that could be procured about them, and the names of the donors, from the Researches and Records of the Society. The *Mammalia* and Birds were all labelled in a similar manner, and a catalogue prepared of a portion of the former, and more than 200 of the latter. These catalogues I shall be happy to send to the Society; the two first immediately, if so required, though I had rather delay doing so till I can copy out and finish the third.

I have now given a fair exposition of my conduct, and furnished any person who may be inclined to comment upon it with ample materials. I hope I have done it in a proper spirit, and avoided any needless asperity of remark: it has been my aim to do so, to defend myself, to offend none; but if I have unfortunately been too harsh, I am sorry for it, and hope some allowance will be made for the feelings of a man who knows that so far from deserving censure for having neglected his duty as Curator of the Museum, he is fully entitled to the thanks the Society accorded him when his services were fresh before them; and that but for his exertions there would not at this moment have been a Museum of Natural History at all.

I have only further to remark, that placed in a public situation as a servant of the Society, I had reason to expect my proceedings would be narrowly watched; and I have no objection to the criticism which by accepting the situation I courted. But I have a right to demand that the criticism should be fair; and that I should not be censured for the blunders or neglect, (if such there were) of others. I pretend to no profound knowledge of Natural History—a science in which, (as I have pursued it as an amusement, and a relaxation from the more serious, and to me more important, study of my profession) I am probably inferior to Dr. Jameson and many others in the country; but I yield not to him, nor to any one else, in the faithful performance of any duty I venture to undertake.

In conclusion, I do not apologise to yourselves, Gentlemen, for trespassing so long upon your pages, for it is in the very nature of a defence to take up more room than an attack; and having published the attack, I am sure you will do me the justice to publish my defence; and the same sense of justice will prevent you from prescribing its limits; while I should be wanting in respect to the Society, if I failed to do my utmost to demonstrate that one, whose services they so long thanked, and paid for, did not unworthily receive their favours.

I have the honor to be, Gentlemen,
Your most obedient humble servant,

Darjeeling, 24th June, 1839. J. T. PEARSON.

Art. XI.—*Proceedings of the Asiatic Society.*

(*Wednesday Evening, the 1st May*, 1839.)

At a Meeting of the Asiatic Society held in the Grand Jury Room:—

The Honorable Sir E. Ryan, President, in the chair.

Read the Proceedings of the last Meeting.

Dr. Martin was proposed by Dr. O'Shaughnessy, seconded by the President.

Dr. Bain was proposed by the Officiating Secretary, seconded by the Bishop of Calcutta.

Professor Agassiz was proposed as an Honorary Member by the President, seconded by the Bishop of Calcutta.

The Nomination was referred to the Committee of Papers.

Read a letter from the Secretary of the Royal Asiatic Society, acknowledging the receipt of presentation copies of Oriental publications, forwarded by the Society.

Read a letter from Professor Lassen to the address of Mr. James Prinsep, proposing that the Society should establish an agency in Bonn for the sale of Sanscrit publications, and bearing warm testimony to the great importance of Mr. J. Prinsep's recent discoveries; requesting also information on the subject of specimens of birds which may be procurable here.

Resolved—That the thanks of the Society be presented to Professor Lassen for his liberal proposal in respect to the agency for the sale of Oriental publications, which appears calculated to be very beneficial to the Society, and that the Officiating Secretary be requested to communicate with him on the subject, stating that the Society has entirely left with him the selection of an agent in Bonn for the sale of Oriental publications.

The Officiating Secretary then read several applications for the situation of Curator, vacated by the departure of Mr. Jameson, but as the candidates' qualifications had not been considered by the Committee of Papers to reach the standard required by the Society,—

It was proposed by Dr. O'Shaughnessy, seconded by Captain Forbes—That Dr. M'Clelland be requested to accept the office of Curator, on the usual allowances.

Dr. M'Clelland returned thanks to the Society, and expressed his readiness to forward the views of the Society in any manner that he was able; but

he regretted that in consequence of his official duties he would not be able to devote more than two hours in the morning to the duties of the Museum. He further stated, that if he accepted the situation on the usual allowances he should beg to condition, that as long as he was Curator no subscriptions be received from members for the preservation of the various collections in the Museum—the whole amount of the salary should be devoted to that object.

The President said that though the offer was very liberal, yet the Society he thought ought to meet from its own funds all such expenses as might be recommended by Dr. M'CLELLAND, without sacrifice to his personal allowance. Dr. M'CLELLAND consented that the appointment should stand on this footing.

Read a letter from Dr. G. VANDENBURGH, of Bonn, touching a box of shells sent by the Society. The names having been detached from the shells, he solicited the Society to transmit another supply, correctly labelled and packed. Resolved—That the letter be referred to the Committee of Papers.

Library.

The following Books were presented :—

Proceedings of the Geological Society of London, for 1837, 5th Part, Vol. 2—Part 2, of 1838 and Vol. 2, Part 3, for 1839——*by the Society.*

History, Antiquities, Topography, and Statistics of Eastern India, by Mr. MARTIN, London 1838, royal 8vo. 3 vols.——*by the Government of India.*

Pickering's Remarks on the Indian Languages of North America—*by the American Philosophical Society.*

Ditto Eulogy on Dr. BOWDITCH, Cambridge, 1838,——*By ditto.*

Translation of the Arabian Nights, by Moonshee SHUMSUDDEEN AHMUD, in Hindee, Vol. I,—2 copies.

Mathematical Principles of Mechanical Philosophy, by the Rev. J. H. PRATT—*by the author.*

The following received from the Booksellers:—

Lardner's Cabinet Cyclopædia on Probabilities.

History of British Birds by W. YARRELL, Nos. 1 to 9.

Museum.

Various skins and specimens were presented in the name of Mr. JAMES MIDDLETON.

Antiquities.

The Officiating Secretary exhibited to the Meeting drawings of Col. STACY's coins cut on type-metal by HURREEMOHUN, a Native Artist, employed in the Calcutta Mint.

Read a letter from Mr. T. H. SALE, of Sylhet, forwarding a facsimile of an inscription taken by him at Gohattee.

A similar donation was received from Lieut. McGREGOR, obtained from the ruins of a fort he was taking down The character in which the inscription was written was clearly legible, but no meaning could be gathered from the sentences.

Captain JAMES LOW forwarded a paper on the Laws of Siam. Referred to the Committee of Papers.

In pursuance of the resolution of the last Meeting, Mr. SUTHERLAND stated that the Commentary compiled by PREMCHUND NYARUTRA was more compendious than the works from which it was taken, but seemed to him calculated to answer all the purposes required. It was a continuation of that printed in the first volume of the work in question,

and had the same merits and defects, but in consequence of some doubt as to whether the Commentary so prepared was likely to be acceptable to Sanscrit students, Mr. JAMES PRINSEP had sent to Benares for the Commentary at length.

It was therefore proposed by Mr. H. T. PRINSEP, seconded by Captain W. N. FORBES—That the best mode of clearing up the difficulty would be to send copies to the Sanscrit Colleges of Benares and Calcutta, and also to Messrs. HODGSON and WILKINSON, requesting them to favor the Society with their opinion on the merits of the work in its present form, and the expediency of continuing its publication.

The proposition was unanimously agreed to.

Read an application from Newab TAHAWUR JUNG, requesting the Society to make a representation to Government on the subject of a subscription for a certain number of copies of the "*Sharaya Islam*," the publication of which had been undertaken by himself in conjunction with the Society, and copies of which might probably be required for the use of the Courts or of the Seminaries of Education supported by Government.

Resolved that the request be complied with.

Col. BENSON handed over to the Officiating Secretary a letter he had received from the vicinity of Amarapoora, dated 23d March, containing an account of an awful earthquake that had occurred in that country.

On the conclusion of the general business of the evening, Mr H. T. PRINSEP stated that he was happy to have it in his power to inform the Meeting of a very distinguished honor that had been conferred upon a Member of the Society, whose selection for the unsolicited distinction was a compliment paid to the whole body.

It had fallen to him, Mr. P. stated, to be the official channel for transmitting to Mr. HODGSON, of Nipal, the diploma and letter of appointment as Chevalier of the Legion of Honor of France, which the enlightened Government of that nation had conferred upon this gentleman, in acknowledgment of his successful labours in the elucidation of various questions of Budhistical faith and doctrine, and in the discovery and procurement of the volumes "*Kahgyur*" and "*Stagyur*," in which a vast mine of curious literature had been concealed, no less than as a tribute due to his zeal in discovering and making known a great variety of new objects of Natural History and Science.

It was heretofore a rare thing to see the Societies of Europe paying tribute to the worth and services rendered to Science and Literature by the learned, in this distant quarter; but of late years their merits had worked out for them a reputation which was now universally acknowledged. Still admission on the ground of literary and scientific attainment to the distinctions conferred by the Sovereigns of other countries was a compliment that Mr. HODGSON only had yet received; and Mr. PRINSEP added, he felt assured that the Society would be glad to have the circumstance placed upon the Records of its Proceedings. Mr. P. then communicated a copy of the diploma of appointment as Chevalier of the Legion of Honor which had just been received, having been transmitted through the Honorable Court of Directors to the Government, to be forwarded to Mr. HODGSON. Ordered to be deposited.

ART. XII.—*Proceedings of the Asiatic Society.*

(Wednesday Evening, the 5th June, 1839.)

At a Meeting of the Asiatic Society held in the Grand Jury Room:—

The Honorable Sir E. RYAN, President, in the chair.

Read the Proceedings of the last Meeting.

Drs. MARTIN and BAIN, proposed at the last Meeting, were ballotted for, and duly elected Members of the Society.

Professor AGASSIZ, of Geneva, proposed at the last Meeting, was upon the favourable Report of the Committee of Papers, elected an Honorary Member of the Society.

Dr. T. A. WISE was proposed by Sir EDWARD RYAN, seconded by Dr. O'SHAUGHNESSY.

Library.

Read a letter from JOHN WASHINGTON, Esq., Secretary Royal Geographical Society, forwarding for presentation the following works, and stating that any Geographical and Statistical Documents would be acceptable in return:—

Transactions of the Geographical Society, 8 vols.

Translation of GRAH's Voyage to Greenland.

Read a letter from Mr. N. GRANT, forwarding for presentation, in behalf of Mr. STANISFORTH, a copy of the Histoire de l'Academie Royale des Inscriptions et Belles Lettres, &c. in 51 vols.

Read a letter from J. P. GRANT, Esq., Secretary to the Government of India, Revenue Department, forwarding for presentation the following Books:—

Illustrations of Indian Botany, No. 9, and Figures of Indian Plants.

Antiquities.

Five Greek Coins, obtained at Delhi by Mr. J. ROBINSON, were presented by J. W. GRANT, Esq.

Three Copper Coins were presented by Dr. G. G. SPILSBURY.

Lieut. McGREGOR forwarded facsimiles of various inscriptions.

Mr. E. C. RAVENSHAW communicated a few inscriptions, collected by him in a late tour through the district of Behar. (Printed in this Number.)

A Tamba Patra with its translation and note on the same, were presented by H. T. PRINSEP, Esq. (This Paper is printed in the April Number.)

Physical.

A Table shewing the Mortality in 13,019 fatal cases in Hindus, distinguishing the diseases and duration thereof, by Dr. DUNCAN STEWART, was read and ordered to be inserted in the Journal. (Printed in the April Number.)

The Officiating Secretaries apprized the Meeting of the completion of Part 2. Vol. 20 of the Asiatic Society's "Literary Researches."

Resolved—That copies be distributed to the members.

ART. XIII.—*Proceedings of the Asiatic Society.*

(*Wednesday Evening, the 3rd July*, 1839.)

At a Meeting of the Asiatic Society, held in the Grand Jury Room:—

The Honorable Sir E. RYAN, President, in the chair.

Dr. T. A. WISE proposed at the last Meeting, was ballotted for, and duly elected a Member of the Society.

Read a letter from J. K. KANE, Esq. Secretary of the American Philosophical Society, acknowledging receipt of several Nos. of the Journal of the Asiatic Society, old series.

Library.

Read a letter from H. T. PRINSEP, Esq. Secretary to the Government of Bengal, General Department, forwarding for presentation the following printed copies of public records:—

Proceedings and Ordinances of the Privy Council of England, vols. 6th, and 7th, 1837, royal 8vo.	2
Kalendars and Inventories of His Majesty's Exchequer, vols. 1, 2, 3, 1836, royal 8vo.	3
Documents and Records illustrating the History of Scotland, 1837, vol. 1st, royal 8vo.	1
Excerpta é Rotulis finium in turri Londinensi Asservatis Henrico Tertio Rege, 1836, vol. 2d, royal 8vo.	1
Rotulorum Patentium et Clausorum Cancellariæ Hiberniæ Calendarium, 1828, vol. 1st, part 1, royal folio, ...	1
Rotuli Chartarum in turri Londinensi Asservatarum, 1837, vol. 1, part 1, royal folio, ...	1
Inquisitionum in Offic. Rot. Can. Hiberniæ, Repertorium, vol. 1, Lagenia, 1826, et Ultonia, 1829, vols. 2, royal folio, ...	2
Report (General) of the Commissioners on Public Records, 1837, royal folio.	1
"The Record of Cærnarvon," Registrum Vulgariter Nuncupatum é Codice M. Sta. Harleiano 696, Descriptum, 1838, royal folio, ..	1

The Officiating Secretary apprized the Meeting that the Geological Society of London has complied with the Society's application for a duplicate copy of the deficient part of the 4th vol. of their Transactions.

Read a letter from the Rev. W. YATES, forwarding for presentation a copy of his translation of the Psalms of David, in Sanscrit Verse, and offering to supply copies for distribution to all the learned institutions with which the Society exchanges its publications.

Journal of the Academy of Natural Science of Philadelphia, 1837, vol. 7th, part 2d, 8vo.—*presented by the Academy.*

Kittoe's Illustrations of Indian Architecture, Nos. 3, 4,—*presented by the Author.*

Chinese Repository, vol. 6th, from January No. 9 to April, 1838, No. 12.

Ditto ditto vol. 7th, from May No. 1 to September 1838, No. 5,—*presented by the Editors.*

New Testament in Hindustánf, royal 8vo.—*presented by the Baptist Mission Press.*

From the Booksellers.

Naturalist's Library, Mammalia, vol. 8th, ... 1
Lardner's Cabinet Cyclopedia, History of Denmark,
History of British Birds, by W. YARRELL, London, 1839, parts 10th and 11th, ...

Antiquities.

Read a letter from H. T. PRINSEP, Esq., forwarding on behalf of the Government of India for deposit in the Asiatic Society's Museum a Silver Plate from Kotah.

To the Secretary of the Asiatic Society.

Political Dept.

SIR,—I am directed by the President in Council to request you will lay before the Meeting of the Asiatic Society the accompanying Silver Plate received by Government from Kotah, where it is stated to have been used for taking observations of altitude and distance.

2d The plate has been for sometime in the Government Toshakhanah, and His Honor in Council does not think that he can dispose of it more usefully than by presenting it for deposit in the Museum of the Asiatic Society.

I have the honor to be, Sir,
Your most obedient servant,
H. T. PRINSEP,
Secy. to the Govt.

Council Chamber, 26th June, 1839.

A description and drawing of this plate will be given in a future number,

Mr. R. DAVIDSON forwarded a bag of leaden Coins for presentation to the Society; the donor has promised to send descriptive notice upon a future occasion.

Mr. W. LOCKE, of Chuprah, forwarded three large slabs with inscriptions, for presentation to the Society.

Mr. H. T. PRINSEP submitted to the Meeting a palm leaf manuscript having the appearance of great antiquity, and which from the circumstance of there being no separate note of the date of copy is presumed to be the original as prepared by the commentator, near 800 years ago. The *Pothi* came by dawk to Mr. PRINSEP's address from Col. ALVES, who forwarded it from Rajwara shortly before he left that country for the Cape of Good Hope, but sent no letter with it explanatory of his wishes or intentions. It is presumed that this is the work referred to in the Proceedings of the 5th April, 1837, vol. vi. p. 240, and therein mentioned as the "*Baudh mat Jain mary grantha,*" and which the Society then expressed the desire to obtain. Mr. PRINSEP added that the manuscript had been put into the hands of KAMALAKANTHA for ascertainment of its value and character. It proves to be a copy of the *Sama Vaya,* in the Maghadhi Bhosha by JINESHWAR, a Jain, with a commentary in Sanscrit by ABHYA DEVA, composed in 1119 Sumbut, corresponding with 1063 A. D.

The work begins with an exposition of the Boodhist religion as professed by Jains, including the worship of *Harr, Hora,* and *Hiranyagarba,* i. e. of *Vishnu, Siva,* and *Brahma.* Then follow discourses—on Dharma and Adharma, showing what is religion and what irreligion, and on the qualities and perfections of *Bhugwan Sakhya Boodh.* On the virtue of abstaining from taking animal life, and of truth and honesty. A resolution of all things to one God. On the place of abode of *Devas* and their means

of locomotion. An explanation of regeneration, and the course of life by which the future birth and condition are affected By what course of action the mind is to be brought into a state of purity and immunity from worldly passion. What sins are fallen into from association with women and loose companions.

On the measurement and depth of the Ocean.

On mental abstraction and worship. On food. What is proper and what improper to be eaten. On times for worship with reference to phases of the Sun and Moon. On behaviour to Gooroos and persons of sanctity. Ditto in assemblies of Jains. On logical proofs and the means of verification.

On the twelve motives of action in man.

On the *Saméra* mountain, its locality, height, &c. It is described as having day only on one side at a time, the other side being in the shadows of night, and as being always to the north of every other country. This description would make it the north pole.

On the size of the Earth and its seven Dweeps.

On the *Bharut Barta*, that is the civilized world of Hindoostan, and the *Ayjya Barta* from the Himalaya to the Bind mountains in Rajmahal, including Behar, which is described as the site of all excellence and the birth-place of *Bhugwan Sakhya Boodh*, and full of sacred places of pilgrimage, of learned men, and authors of holy books.

The work closes with two slokas in praise of JINESHWAR, the author of the original treatise in the Maghadha language. The commentator describes him as the author of Granthas, and his own Gooroo or spiritual teacher. The Pundit KAMALAKANTHA concludes the meaning to be, that he is the author of this particular work the "*Sama Vaya*;" but the Jain Pundits declare the treatise to be of much greater antiquity than the commentary, and construe the expression "author of Granthas" as merely describing him as an author, not as the author of the particular work.

Ordered that the book be deposited, and that the thanks of the Society be conveyed to Col. ALVES for this valuable addition to its Library.

Physical.

Various specimens of fossils were forwarded for presentation by Dr. G. G. SPILSBURY.

Read a letter from M. A. D. DE CASANOVA, intimating that His Majesty the King of Oude has forwarded through his Minister the Nawab MAHAMED ALI KHAN, for presentation to the Society, skeletons of an Elephant, of a Camel, and of a Tiger, prepared by the writer of the letter.

Read a letter from H. T. PRINSEP, Esq., transmitting copy of a letter from Mr. Assistant Surgeon PEARSON to his address regarding specimens of a fragrant wood, leaves, and bark, found by him in the Darjeeling hills—also of a mineral occuring in the same locality.

The tree in question is doubtless the *Cinnamomum tamala*, common on the lower range of hills, and which affords the *Tezpat* of the bazars. The mineral is identical with the coarse Plumbago discovered by Dr. CHAPMAN in 1837.

To the Officiating Secretary to the Asiatic Society.

Political Dept.

SIR,—I am directed by His Honor the President in Council to transmit to you the enclosed copy of a letter from Mr. Assistant Surgeon PEARSON, under date the

10th ultimo, together with specimens of a fragrant wood and other articles found in the mountains of Darjeeling, and to request the opinion of the Society as to whether the articles are a valuable product.

I have the honor to be, Sir,
Your most obedient humble servant,
H. T. PRINSEP,
Secy. to the Govt. of India.

Fort William, 12th June, 1839.

To H. T. PRINSEP, ESQ., *Secretary to the Government of India, &c. &c. &c.*

SIR,—I have the honor to forward for the consideration of the Government, and presentation to the Asiatic Society, should it be deemed fit, a specimen of a fragrant wood found in these mountains, the leaves of the tree of the same, a gummy substance found in the Morung, and a mineral I discovered between Pemkabarry and Idwiseangurry; in the hope that they may be found useful.

The tree from which these specimens were taken was about nine inches in diameter, and twenty-five or thirty feet high. The bark and the wood appear to be equally fragrant, and the odour to be developed by the application of a gentle heat; along with the wood are a few detached pieces of bark.

The leaves of the above tree are called *Tej-Putta*, or *Tez-Path*, or some such name, as I am told; and are used in curry as a *mussala*. If so, the tree is probably well known to others, though new to me; but I doubt if the fragrant quality of the wood is known.

The gum is common in the Morung, and may be collected in large quantities if thought worth the trouble.

The mineral is in a considerable quantity by the road side. I have not the means of analysis, but it appears to me to possess some of the qualities of plumbago. I had neither means nor time to search for purer specimens, but if my conjecture is correct, this mineral promises to be useful for machinery, and some of the purposes of inferior black lead. I have said that it appears to be a sort of plumbago, and I may point out how near some of it looks allied to micaceous schist, from whence, again, the transition is easy to some of the forms of gneiss.

I have, &c.
(Signed,) J. T. PEARSON,
Asst. Surgeon.

Darjeeling, 10th May, 1839.

(True copy,) H. T. PRINSEP,
Secy. to the Govt. of India.

Read extracts from a letter from M. Alphonze BAZIN, Baron du Chanay, &c., with reference to a project of an Electro-Hydraulic Telegraph for effecting correspondence between Calcutta, London, and the rest of the world. An analysis of the memoir was given, specifying construction and expenses. The illustrative drawings and plans were also exhibited.

Proposed by Dr. O'SHAUGHNESSY, seconded by the LORD BISHOP of Calcutta, and carried unanimously—That a Sub-Committee of the Society be appointed to examine and report on the project to the next Meeting, to be held in the first week of August.

M. Alp. BAZIN communicated through the Secretary to the Meeting, that his political engagements, and the unsettled state of European affairs, rendered it absolutely necessary that his plans should be examined and reported on without delay, and he named the 12th July as the longest period he could wait the decision of the Society.

It was thereon explained to M. BAZIN by the Secretary, that the rules of the Society did not permit a reply being given within the period proposed; and that the project was so vast and extensive that it required to be studied with proportionate deliberation. M. De BAZIN still pressing for an early reply, it was proposed by the Honorable Sir Edward RYAN, President, seconded by the Honorable Sir John Peter GRANT, and unanimously agreed to—

That the memoirs, plans, estimates, drawings, &c. communicated by M. BAZIN be returned to that gentleman with the usual acknowledgments.

The Officiating Secretary then read the following Memorandum on the Society's finances, income, and expenditure:—

To the President and Committee of Papers of the Asiatic Society.

GENTLEMEN,

I have to solicit your attentive and immediate consideration of the circumstances I am about to bring to your notice regarding the state of the finances of the Society.

The subject divides itself under two sections—1st, the liabilities of the Society for past causes of expenditure; and, 2d, the current or monthly expenses on the scale at present sanctioned.

Our liabilities under the first head amount to the large sum of Rupees 16,530, and proceed from three items—7348 Rupees due to the Baptist Mission Press for the publication of the "*Mahabharata*" &c.; 1182 Rupees to Bishop's College Press, for the publication of the Volume of the Transactions just issued; and 8000 Rupees to Messrs. Sherriff and Co. due on the completion of the new buildings now in progress.

Our current *Monthly Expense* meanwhile amounts to 1373 Rupees, as specified in the undermentioned items:—

Oriental Publications, ...	500
Establishment for the custody of Oriental Books transferred from the College of Fort William, ...	78
"Journal" supplied to 126 members at 1/8 per mensem, ..	207
Secretary's Office, ...	85
Museum Establishment, including allowance to Curator of 150 Rs.	238
Museum Contingencies, ...	77
General Contingencies, ...	25
Library, ...	163
(annas and pice not included) Total, Rs.	1,373

The balance now in hand of our funds in Government Securities amounts to Co's. Rs. 20,800 at 4 and 5 per cent., of which 4730 Rs. have accumulated from the monthly Government allowance of 500 Rs. as shewn in the margin, and are applicable to no other purpose but Oriental publications.

Our *Monthly Income* stands thus:—

Average payments by members, as shewn by experience of four past years, ...	400
Government grant for Oriental publications, ...	500
Ditto ditto for custody of Oriental Books, ...	78
Ditto ditto for Museum and Library charges, ...	200
Interest on balance, allowing for the full payment of debts, ...	28
Total, Rs.	1,206

Shewing an excess of expenditure beyond our income of 167 Rupees per mensem.

We have consequently to consider the best mode of discharging our accumulated debt, and of reducing our monthly expenditure so as to bring it clearly and certainly within our monthly income.

With reference to the contract with Messrs. Sherriff and Co. for our new buildings, a resolution of the Society directs our defraying the amount of this item by the sale of the necessary sum from our Government Securities. This will reduce our capital to 12,800 Rupees, yielding a monthly income of 42: 10: 8.

The bill to the Baptist Mission Press is so long due, and of such considerable amount, that we must take immediate steps to place it in course of liquidation. The Bishop's College Press demand has been made, moreover, under circumstances which render it a matter of justice to that establishment that the amount should be paid with as little delay as possible.

I have therefore to beg your sanction for a further sale of our Securities to the amount of 1182 Rs. to be paid to Mr. Ridsdale for the part of the "Transactions" now published. This reduces our capital to 11,618 Rupees.

To meet the Baptist Mission Press claim, I propose—1st, that we make over the balance of 4730 Rupees, applicable to Oriental publications, and accumulated from our Government allowance of 500 Rs. per mensem; and, 2dly that for the balance of 2618 Rs. of the same account we pay a monthly instalment of 500 Rupees, applying thereto the allowance we receive from Government for Oriental publications; and that pending the payment of these instalments, we discontinue all Oriental printing, translations, &c. by which a further debt must otherwise be contracted.

Our capital thus freed from all incumbrance will be reduced to the scanty sum of 6888 Rupees.

Should these propositions be agreed to, we will still possess funds to the amount of 6888 Rupees, which it seems expedient to reserve for one object alone, namely the publication of future volumes of Transactions of the Physical Class.

I must here mention two sources of expenditure almost immediately before us, at all events to be met in the course of the year; I allude to the forthcoming volume of Researches of the Physical Class, and the furnishing of the new Museum apartments. For the former, as already shewn, I fear we must have recourse to our "Securities." The means for the latter (which may be estimated at about 1200 Rupees) I would propose to collect by subscription among the members of the Society.

Current Expenditure.

From the items above specified, it is evident that we now expend per mensem 167 Rs. beyond our income. We must accordingly either reduce our establishments within corresponding limits, or devise some means of increasing our permanent pecuniary resources.

I proceed to take up the items of our expenditure *seriatim*, which will enable us to see where the pruning knife may be most advantageously applied.

1. *Oriental Publications*—500 Rupees.

This sum we are bound to expend, whether in new works, or in paying for the old by the instalments, as above suggested.

2. *Journal*,—supplied to 126 members @ 1/8 per No. and 12 Nos. to learned Societies.—207 Rupees

I wish heartily it were in my power to offer the Journal to the Society on more favorable terms, but the bills circulated to the Committee for the first quarter of the periodical, shew that it is only the support of the Society to its present extent that can permit the continuance of the Journal in a respectable shape. The plates alone for No. 4 will cost over two hundred and seventeen rupees.

The question as to this item of expense thus evidently becomes one of the existence or discontinuance of the Journal. I am glad to say we have not lost more than six subscribers since the commencement of the New Series—not quite the average number of secessions in the same period of previous years.

3. *Secretary's Office and Contingencies—Items of expense :—*

Salary to Herambanath Thakoor, ...	60*
Sirkar, ...	10
3 Peons, ...	15
Stationery, Postage, Lighting, Wax-cloth, Cooly hire, &c.	25
Total, Rs.	110

* This Officer's salary was increased from Sa. Rs. 40, (Co's. Rs. 42 : 10 : 8) by a vote of the Society in January of this year.

4. *Museum*—Total charge, Rs. 305.

	Items.	
1st Taxidermist, ...	50	
2nd Ditto, ...	12	
2 Carpenters @ 8/	16	
2 Farashes @ 5/	10	
		88
Curator, on scale paid to Messrs. Pearson, Evans, and Jameson, ...		150
Contingencies on scale of last year (exceeded in the months of this year)		77
Total, Rs.		305

With reference to this Department, Dr. M'Clelland has favored us with a memorandum to the Committee, which I have had the pleasure to circulate in original.*

Dr. M'Clelland in this Paper gives a brief History of our Museum—glances at the principles on which it should be arranged—offers suggestions as to the furniture required for our new rooms—and presents a plan (which appears to me an excellent one) for securing a correct nomenclature, by a system of correspondence with acknowledged authorities at home. Dr. M'Clelland then notices the expenditure for the past year in this Department, and which exceeded the Government grant of 200 Rupees monthly, by about 100 Rupees per mensem (total 1171 Rupees) from which only 240 Rupees were expended on cabinets or other permanent articles.

Dr. M'Clelland observes that the Head Taxidermist cannot write, and therefore cannot be entrusted with any important charge beyond his manual duties. The necessity however of having some well-informed man constantly in attendance to wait on visitors, &c. is justly pointed out, and it is recommended that the Assistant Librarian, Mr. Bouchez, who now receives 30 Rupees, be appointed to the charge on an increased salary, say to 50 or 60 Rupees.

* Inserted in this Number, page 415.

By this arrangement from 70 to 80 Rupees monthly would still be available for petty expenses, without exceeding our Government allowance "exclusive of cabinets and Curator's salary."

Dr. M'CLELLAND then proposes that the office of Curator should be *honorary* and *temporary*;—that instead of permanently employed carpenters, native shekarees and collectors on the same allowances, be maintained; lastly, that some well educated youth, having a taste for Natural History, should, if possible, be selected from one of the public Schools to conduct the duties of the subordinate establishment of the Museum. But this seems to be unnecessary were the Assistant Librarian employed as advised by Dr. M'CLELLAND in the first part of his Paper.

Dr. M'CLELLAND concludes by stating, that he does not object in *principle* to our maintaining a *paid* Curator, and that "should the means exist after defraying *essential* expenses," that some specific sum "a nominal salary of 30 rupees per mensem, for example, be given to the Curator, or a larger sum if consistent with the Society's means."

I have also circulated a copy of the "Rules for our Museum" which Dr. M'CLELLAND suggests, and I now beg leave to propose, that they be adopted, with this modification, that "the Curator be requested to accept the sum of 50 rupees per mensem for his "*conveyance expenses*," the Society at the same time placing on record a public declaration of their obligations to Dr. M'CLELLAND, for the liberality and zeal for the interests of Science he displays on this occasion.

It will be necessary also to allow a Writer and Duftury to enter the correspondence, and keep the books of the Museum.

This arrangement will reduce the Museum Expenditure as follows:—

Reduced Museum Scale:—

Curator's conveyance allowance,	....	50
Head Taxidermist, ...	....	50
Second Ditto, ...	....	12
Attendance of Assistant Librarian,	....	20
1 Shekaree, ...	....	8
2 Farashes @ 5, ...	....	10
2 Collectors, ...	....	16
Writer, Duftury, and Contingencies, say,	....	34
	Total, Rs.	200

5. *Library.—Items of expense.*

1 Librarian, ...	....	100	0 0
1 Assistant Ditto, ...	....	30	0 0
1 Duftury, ...	....	8	0 0
2 Derwans, ...	....	12	0 0
1 Farash, ...	....	5	0 0
1 Gardener, ...	....	4	4 0
1 Sweeper, ...	....	4	4 0
1 Seculgur, ...	....	2	2 0
Contingencies, ...	....	5	0 0
	Total, Rs.	170	10 0

At present I do not think it possible or desirable to effect any reduction in this Department. Should any vacancy occur while our funds still demand reduction of ex-

pense, we might promote the present Assistant Librarian on a small advance of salary; this would save about 80 rupees per mensem. But such a contingency it is to be hoped is far distant, as the Society is most fortunate in now possessing in M. Csoma De Korosi a Librarian of equal celebrity and erudition.

I now beg leave to recapitulate briefly the measures I would suggest in order to extricate us from our old debt and bring our expenditure nearly within our income.

1st. The immediate payment of 1182 Rupees to Mr. Ridsdale, of Bishop's College Press.

2d. The payment of 4730 Rupees cash, and an instalment of 500 Rupees per mensem to the Baptist Mission Press, and the suspension of Oriental publications until the debt of 8000 Rupees is liquidated.

3d. The arrangement of the Museum on the scale above noted.

4th. The opening of a subscription for 1500 Rupees to provide furniture, cabinets, &c. for the new rooms.

On completing these arrangements our *Expenditure* will be:—

Library, ...	170	
Museum, ...	200	
Journal, ...	207	
Oriental Publication Debt, ...	500	
Custody of Oriental works, ...	78	
Secretary's Office, ...	110	
	——	Total, Rs. 1,265

And our *Income*:—

Government allowance for Oriental publications,	500	
Ditto for the custody of Oriental Books, ...	78	
Ditto for Museum, ...	200	
Average of Subscriptions, ...	400	
Interest on Government Securities	28	
	——	Total, Rs. 1,206

shewing, lastly:—

Income, ...	1,206
Expenditure	1,165
Excess of expenditure still,	Rs. 64

To meet this deficit we must unfortunately draw on our scanty cash balance every month until some opportunity presents itself for bringing our income and outlay on an exact par; meanwhile we must adopt one principle firmly, namely—"to allow no expense under the item of 'Contingencies' to be passed in any Department without the special order of the Committee of Papers."

(Signed) W. B. O'SHAUGHNESSY,
Offg. Joint Sec. Asiatic Society.

19*th June*, 1839.

The sense of the Meeting having been taken by the President, was declared unanimously favorable to all the above propositions except the 4th. These were accordingly adopted and will be acted on from the first of August. Instead of a subscription it was decided by the Meeting to furnish the new rooms from the cash balance remaining, and that no appeal should be made to the members for extra aid, as long as any funds remained available.

JOURNAL

OF

THE ASIATIC SOCIETY.

No. 90.—JUNE, 1839.

ART. I.—*Extracts from the Narrative of an Expedition into the Naga territory of Assam. By* E. R. GRANGE, ESQ. *Sub-Assistant to the Commissioner, Assam.*

On the morning of the 5th January, 1839, I left my encampment below the village of Dikkling, or Dhemra, with the detachment of Assam Seebundees at nine o'clock, and crossing the river entered a newly cut road which conducted us to the Dyung again, about half a mile above the village in a southerly direction, where we crossed the river, and found a very good path which brought us to the village of Somboo at 1 P. M., a distance of about nine miles. The first three-quarters of the road was through a flat country covered with forest trees and light underwood; the latter part the ground became undulating, and still covered with forest. Somboogong is a village consisting of about twenty or twenty-five large houses, situated on a low hill on the right bank of the Dyung river; the inhabitants are Cacharees, they cultivate lands on both sides of the river, but chiefly in Cachar, asserting that the soil on the left bank is of a more productive nature than on the east; several families here had formerly come from Semker, having left that place in consequence of the incursions of the Angamee Nagas.

The passage to Somboo from the Dyung-mook by water was said to be two days journey on account of the number of *Silbatahs*, or weirs.

The language of the Cacharees of this and all the other villages I met, was totally different from that of the inhabitants of the plain, though they all go by the same name; the Hill Cachare is called *Hoje*, and that chiefly spoken on the plains called *Ramsa*.

January 6th. Having received an injury in my feet from the previous day's march, I took a boat from Somboogong to the next march, Patpoah, a tolerable village belonging to Toolaram Sanaputtee, situated on the east side of the river. Starting at 9 A. M. the Sepoys reached the halting place at about 3 P. M. having been fatigued by passing several tolerable sized hills; they told me the path was a good one, and they passed a large village of Mikeers called Hempree, the cultivation of which I saw on the river side. This day's journey was through Toolaram Sanaputtee's country.

The rapids or *Silbatahs* the natives spoke so much of to deter me from going by water, I found only to be of stones piled up for the purpose of fishing and deepening the water to enable the boats laden with cotton (some of which I saw on their way down) to pass the more easily, in other places there is abundance of water. The banks of the river are high, and at most places formed by low hills and some steep rocks; the distance by water is about fifteen miles, and by land eight or ten.

The elephants which had taken the route formerly traversed by Captain Jenkins, which we left two or three miles below Somboogong, joined us here.

January 7th. Starting from Patpoah at 9 A. M., we passed over some cotton grounds, and gradually ascended a range of hills running north and south, and after continuing along the summit of the ridge till 2 P. M., we descended by rather a steep path to the Langti river where, on account of the elephants not having come up, we were obliged to halt for the day; the road throughout was good, through bamboo forest.

The Langti is a rapid clear stream, of about thirty yards width, knee-deep in the cold weather with a pebbly bottom.

January 8th. At 7° 45′ A. M. left the Langti river, and ascended a rather steep hill, and an hour afterwards left Captain Jenkins' road which we had met at Patpoah, and took a more easterly direction to Aloogong, crossing the Dyung at a *Silbatah*, or weir, where the water rushed with a good deal of velocity. The distance to-day was only about five miles; but our next march being a long one, I was unable to go on further without distressing the men, as we should have found it difficult to have reached Chota-Semker in one day from the Langti river, and no other village or watering place was available. Boats come up to Aloogong during the cold season, though they experience much difficulty at the Barrak ford from the rocks in the river, the boats requiring to be unladen and forced up empty. The road continued good to Aloogong through bamboo and tree forests. Aloogong consists of about twenty or thirty houses of Cachareos.

January 9th. Left Aloogong at 9 A. M. and ascended a ridge of hills running east-south-east; traversed them till they divided into two ridges, when taking the one to the right, in a south-west direction, reached the site of a Cacharee village, which had the appearance of having been burnt; from thence, by an undulating path, we came to a hill of good size at 12 P. M. and in about an hour afterwards reached Chota-Semker, which lay on our right, about 500 yards. It consists of about fifteen or twenty houses of Cacharees and Nagas; the latter had on account of some feuds left Bura-Semker, which is about two days march eastward. We halted about two miles beyond the village on a small stream; the elephants did not come up till late; the path throughout was good.

January 10th. Sending the elephants back from this place we set out at 8° 15′ A. M. and crossing a small stream called Delasapanee, continued by a wavy path till 10 A. M. when we descended to the bed of the Dyung, where we met the Mohurir of the Tossildar of the Cachar Hills. From this our course was about south-south-east and south up the bed of the river, the repeated crossing of which rendered the marching both painful and dangerous, from the difficulty of keeping one's footing over the round slippery stones with which the river in every part abounds. At 1 P. M. we halted a short way beyond the village of Joori, which is a good sized one, and is inhabited by Cacharees and Kookees; it is on the left bank of the river. The road to-day was not so good, the latter part of it being in the course of the river.

January 11th. Started from Joorigong at 8 A. M. our route being the same as the latter part of the previous day—up the bed of the river, and the same difficulties were again experienced, which prevented our reaching the stockade under Goomegogoo till 12 P. M., though the distance is not more than five miles. I found the Shans in the stockade, who had arrived two days previous. Toolaram Sanaputtee had accompanied them. I requested him to send some person of his to Semker to prepare habitations and provisions, but he immediately offered to go himself if I gave him a guard, I therefore detached a Naick and ten Shans to accompany him. Finding that the Thannadar, who had only lately arrived, could give me but little information regarding the incursions of the Angamee Nagas, and finding no instructions waiting my arrival, I resolved, as Captain Burns's head quarters were only four days' journey off, to proceed to Silchar at once, to consult with that officer on the plan of future operations. This journey I commenced on the 13th January, taking with me a guard of one Naick and four Sepoys. Leaving the stockade at 9 A. M. we reached the Naga

village Mysumpa at 10 A. M., passing through which I reached the original site of the Thannah of Hoflong, close to the above village, which had been a short time before removed to its present location, Goomegogoo, to protect from the Angamees the large Naga village of that name, four persons of which had been killed some time previous by them. Beyond the old site of the Thannah of Hoflong is the hill called by the Cacharees and Nagas *Honklong*, which by corruption has become Hoflong; passing over it the road descends to the bed of the Pytinga, a small river here flowing towards the south-west. Down its rocky bed we continued till we reached the Cacharee village of Poorah, on the left bank of the river, consisting of about twenty or twenty-five houses. The first part of the road was good, but became bad on entering the river.

January 14th. Leaving Poorahgong at 7° 45′ A. M. we set out down the bed of the river as on the 13th till 9° 20′ A. M., when we reached the Hagoosa-Deesa, a small stream running from its source at the summit of the Bura-Ail range in two branches, one falling north and one south. We quitted the Pytinga, and ascended by a very steep path the Bura-Ail range of hills; from the summit, which we reached at 10° 30′ A. M. we descended by an easy path to the south side, and found two streams joining at the base, the Hagoosa-Deesa coming from the west, and the Mati-Deesa from the east. The great range is chiefly covered with large trees and light underwood; amongst the former I recognised the *Nageser* tree, of tolerable magnitude; I saw no bamboos on the higher ranges. Proceeding a short distance we encountered the Matura-Deesa, which flows from the eastward. Rising in the great range, the Mati-Deesa empties itself into the Matura here. We continued down the bed of the Matura some short way, and then followed a bad path frequently up by water courses. At 12° 50′ P. M. crossed a small mountain torrent called Ballon-Deesa, which runs over a bed of solid rock; at 3 P. M. reached the Goonmara-Deesa (*Deesa* signifies a small river in the Cacharee language) which is the only convenient halting place between the foot of the great range and the plains; we encamped here.

January 15th. Started at 7° 30′ A. M. and about a couple of hours afterwards passed the Cacharee village of Longerong, which remained on our right on a ridge of hills separated from those we were traversing by the Dhesema river, which flows into the Matura after receiving the Goonmara river. At 10° 25′ ascended to the summit of the last elevated hill of the ridge, from whence a very fine prospect is enjoyed of the extensive level of the entire Cachar plain, with its numerous hamlets and sheets of rice cultivation. The road from hence to the

lower hills was steep. Having descended to them we passed through patches of deserted cultivations of the wandering Cacharees. At 2 P. M. crossed the Hogigugaw river a short way above its junction with the Kuttna, which river terminates in the Matura. At 3 P. M. we passed through the large Cacharee village of Guabari, and here saw evident signs of improvement in the condition of the country. After crossing fine sheets of rice lands belonging to several villages of Bengallís and Muneeporees we arrived at the Bengallí village of Bhogurkonah and encamped. The fields of rice here appeared fine, but the ryots seemed to be less particular in the comfort of their *Khatts*, or farms, than the Assamese. They lived in fewer houses, which however were larger than those in Assam.

The absence of the useful and ornamental jack, tamool, and moongah trees made the appearance less rural and comfortable than the generality of the Assam farms.

January 16th. At 8° 30′ A. M. crossed the Tecul or Degul river, and passing another swampy nullah, and some jungle, reached a cluster of low hills covered with small bamboos *(Bagul Bans)* over which we passéd, and came to another sheet of rice land attached to some widely scattered Muneeporee hamlets.

The road was now south-south-west over the rice fields, till we reached the village of Oodarbund, on the right bank of the Matura river, a place of considerable importance, being the entrepôt to which the Cachar Nagas take down their cotton to barter it for salt, dried fish, conch shell, beads, &c. and I heard also for slaves, who are stolen from the weaker Naga villages; an infamous trade of this kind seems carried on in the hills of Cachar. The Nagas are particularly fond of the conch shells, which they cut up for neck ornaments, and which are valued at one rupee per shell. From Oodarbund we went across a fine plain of rice stubble to Mennabund, and then passed through a strip of jungle and recrossed the Matura; from this our road lay across rice fields of about a league in extent; we then ferried over the Barak river opposite Silchar, which we reached at 3 P. M. The Barak is a considerable river, evidently, from the broken state of its banks, liable to a very great rise of water in the rains.

January 17th. Captain Burns, who was absent on my arrival, returned this morning, and availing myself of his kindness, I remained till the 19th, and obtained much valuable information and assistance from him with regard to my future plans, &c. I recommended that the expedition should start immediately against the Angamees (who were supposed to be located a short way beyond Semker) with the party I had brought over from Assam, as great delay had occurred

in the arrival of arms for the levy, and there was no certainty when they might come, and as the season was fast approaching when troops would be of little service in mountains, like those inhabited by the Angamees. All the arms in Silchar were therefore put under repair, and about thirty muskets with bayonets, furnished weapons to an equal number of the levy, who, under a Jemadar, accompanied me back.

On the 19th I retraced my route of the 16th to Bhogurkonah, where we halted. The next day, the 20th, I followed my former route to Guabari, where the Bengallí coolies were to be relieved by Cacharees. The inhabitants of the village being all away on our arrival a great delay occurred, which obliged me to alter my course and make a circuit to Agoosagong to get good encamping ground, where we remained that day. The village consists of about fifteen or twenty houses inhabited by Cacharees, who cultivate the lower hills under the great range bordering the Cachar plain.

January 21st. Started from Agoosagong at 8 A. M., and ascended a high ridge adjoining the one we came by, and shortly afterwards regained the old road, along which we continued till we reached the Matura river, where we encamped. This route, I fancy, is impassable in the rainy season, as it is frequently up the bed of the river. A good one, however, might easily be made with little trouble, either at the foot of the hills or on their summits.

January 22d. Left at 8 A. M. and ascended the Bura-Ail range half an hour afterwards, by a good path ; we reached the top in forty minutes, from whence we quitted our former route from Poorahgong and continued along the summit of the great range by a very good path, leaving Poorahgong on our right, and in the valley beneath. We followed this route about an hour, and then by a long and pretty steep descent crossed the Goomara-Deesa, and shortly afterwards the Longkli-Deesa, both flowing from the great range into the Pytinga, parallel to which we were going. We then entered the bed of the latter river, and followed our former route over the Haflong hill to the stockade.

January 23d. Some provisions that had been left behind the previous day arrived.

January 24th. I visited the Goomegogoo Thannah on an height of about 5000 or 6000 feet elevation, and took some bearings of peaks, sources of rivers, and situations of villages in sight. I sent on the Shan detachment this day with grain to Semker to relieve the coolies, and enable them to return and carry more grain with the Sebundy detachment. Whilst here, I got in several villagers upon whose villages some of the attacks had been made, and took down their depositions. The people

of all except of one village, Longki, accused the Angamees of being the guilty persons in the late murderous attacks on their villages. The people of Longki stated that the inhabitants of Deelong and Kollering were the aggressors in the incursion on their village. The people of those villages, however, most positively denied having done so when summoned at Semker.

On the 26th, having collected a sufficient number of coolies, I set out for Semker from Goomegogoo with the detachment of Sebundees and the part of the levy that came up with me, who were joined here by about twenty more men from the Jumnah, who had come up previously under their commandant, Doogaram Subadar, who had arrived from Doodputtee. We started at 8 A. M. by a good path over a ridge of low hills, in an easterly direction, skirting the Goomegogoo mountain. At 9° 30′ A. M. passed the former site of the Naga village called Nerlasso, which was deserted three years ago in consequence of an attack on them by the Boesompoe Nagas, who killed several of them. At 10° 30′ A. M. we came to a mineral spring on the banks of the Mootee, a small stream running towards the Dyung, into which it falls. Ascending and gradually winding round some hills, and leaving the village of Hassung-Hagoo to our right, we descended to the Mahoor, a good sized stream flowing north to its junction with the Dyung below Aloogong, and forming a good boundary line of Toolaram Sanaputtee's country. We crossed and went down its bank, and halted at 2 P. M. after a march of about thirty miles.

January 27th. Leaving our encampment at 8 A. M., we crossed over some low hills by a good path, and crossing two streams, the Yah and Yhoo, which empty themselves into the Mahoor, passed some more low hills and entered the bed of the river Hah, the banks of which were covered with the foot-prints of wild elephants and deer. Along this stream we continued for an hour, and then ascending a very steep hill reached the large Naga village of Rangai, then completely deserted in consequence, as I was informed, of the Angamees having attacked it, and having, it is stated, killed 107 persons and carried away 30. I however think the number stated to have been killed is exaggerated. A fine view of the country is obtained here, and the hills towards the Assam side appear mere undulations in comparison to the gigantic ranges on our right. From this we had a fine view of the Deoteghur mountain, which hitherto had appeared to be a part of the main range, but now we had a full sight of it, shewing itself independent of any other hills. Large patches of brown clearances for cotton cultivation were visible; the wind was very high and cold on this mountain. We went along its summit, and descended winding round another very

high hill till we came to cultivation, from whence we looked down upon Semker, on the foot of a hill beneath us. By a very steep path we descended to the encamping huts erected by Toolaram Sanaputtee, who had previously arrived with the Shans I had attached to him. He had not been up to Semker for many years, and therefore was ignorant till now where the Angamees were located, which to my astonishment I found to be eight days journey further on. I applied to Toolaram Rajah for a statement of the depredations committed by the Angamees on his people, and found several of his Naga villages had also been sufferers; and on inquiring the reason of these attacks, I was informed that they were merely to extort conch shells, cloths, &c. and that the Angamees seized as many people as they could, to obtain ransom from their relatives, and killed all that attempted to escape, cutting off their heads (with the blade of their spears) which would be ransomed by their relatives also, this being one of the barbarous customs of the Nagas. I also applied for a statement of the sufferers of the village of Rangai, but the Rajah could not furnish one, as the people had all fled into the jungles, he knew not whither. I was told that the people of Semker also were thinking of leaving their village for another place, till they heard that troops were going against the Angamees, for they also were in daily fear of being cut up, which they certainly would be the moment they refused to bribe them with salt, dried fish, &c. The Semker people are not great cultivators, but live chiefly by the produce of their salt springs, and by traffic with the peaceful Nagas around them. They bring dried fish, beads, conch shells, and brass ornaments from Oodarbund Haut, and barter them for cotton, wax, ivory, chillies, &c.; and an extensive and infamous trade is carried on in slaves, who are stolen indiscriminately by all in that quarter, and sold to the Bengalli merchants who go up for cotton. I hear that a slave can be procured for twenty packets of salt, seven of which are to be had for one rupee. I saw many Muneeporees, who had been thus seized whilst young, and sold both amongst Kookees, Cacharees, and Nagas.

There are 140 houses of Cacharees, and five or six of Nagas, but the Semker Cacharees are demi-Nagas, and many of them have married Naga girls. They have lost the good qualities of the Cacharee, and resemble more the meaner and more cowardly Nagas of the lower hills of Cachar. I found here Ohkonah of Umbawlo, or Inghong, and Hajootoe, on the part of Equigimpo of Beren, two chiefs of independent villages who had heard of the approach of the troops, and both came to offer submission, and to seek protection from the Angamees. They seemed much afraid lest we should not attack

the Angamees, and return, and leave those who had sought protection, and afforded assistance to us, to the vengeance of their cruel neighbours; they also seemed anxious in regard to their villages, but I assured them we would not go near them, if they could cut a road by which we might avoid them, and that they had not the least cause to fear; on which they appeared much satisfied, and said many other villages would come in after they had heard of the kind treatment they had received. I gave them presents, and dismissed them, and told them to prepare grain for us, which they promised to do. I found here the following friendly chiefs, besides those above alluded to, viz. Kaptao of Kareabong, Kamtao of Galiga, Katalong of Ohong, whose villages were on our right, in the direction of the Angamee mountains. They also agreed to furnish grain as we passed their respective villages, and each received presents. Immediately on arriving at Semker finding that I could only calculate upon 100 Kookees, who were as bad as Nagas themselves for throwing away their burdens and running off, I applied to the Bura Bundaree, who farmed the Cachar hills, to furnish 300 men, which he could easily have done, and which he promised to do. Delay occurred, however, and so I wrote to him again and again informing him that if the expedition was kept much longer from advancing, through his dilatoriness, it might prove of serious consequence. I learnt that he was not collecting the men as he wrote to me to say he was doing, but that he had sent a petition to Captain Burns, Superintendent of Cachar, stating that he found great difficulty in complying with my request. At the same time that I received Captain Burns' letter informing me of the difficulty stated, two Kookee chiefs joined me, and informed me of the injustice the Bura Bundaree exercised towards their tribes, in pressing all the Kookee population and not calling upon Cacharees, on whose account the expedition was undertaken. I was told that many of those excellent ryots the Kookees had left the Hills in consequence of bad treatment, and their being employed and worked on every occasion, whilst the Cacharees were never called on for their service. I ordered the Bundaree to furnish an equal number of men from each tribe, but deeming it imprudent (from the lateness of the season) to remain any longer at Semker, disputing with one who instead of throwing obstacles in the way ought to have been the first to have put his shoulder to the wheel, I resolved not to run the risk of being again put off with his falsehoods, and informed Captain Burns of his misconduct; then collecting all the Naga and Cacharee men I could, I sent off the Shan detachment and Ram Doss Morhuir to Beren, with instructions to collect as much grain as they could get, no coolies having arrived. I left Semker with forty Cacharee

and Naga coolies of that village at 12 P. M. I was obliged to leave Doorgaram Subadar behind with part of the levy, as there were no means of carrying provisions for them. The Subadar had instructions to follow when he could get coolies. Passing over two ravines we crossed the Kondekong river, flowing in a north-west direction towards the Langting. This latter river rises near Semker, and falls into the Dyung. Our route here being up the bed of the Kondekong was very unpleasant; after continuing this for two miles we crossed over a small hill in the middle of the valley, which brought us to the Dikkan river where we encamped, some in huts which the Shans had erected; the distance we travelled was about five or six miles.

February 16th. Started at 7 A. M. and passing a few inconsiderable ravines, formed apparently by mountain torrents, we came to a small hill from which there is an extended view of the valley beneath, and of the great range which runs north-east. From thence we descended to the Sorebackee river; following its course a short distance, we left it to cross over a small plain to the Par river, a stream of about thirty or forty yards broad, flowing northerly. Leaving it we crossed over another plain to a river of similar size called the Aungootee, which is joined here by the Harikondee, a small stream, along the bank of which we continued our course. These streams all flow from the Bura-Ail range, as do indeed all rivers tending from the north to Assam. The ground over which we passed was partly free from very heavy jungle, and appears to have been at one time under cultivation, and of a rich nature. Shortly after leaving the Aungootee we ascended a hill and passed the site of an old Naga village, and then descended to the encampment of the Shans on a tongue of land formed by the junction of the Tomkee and Toolongkee rivers. The distance we travelled to-day was about twelve or thirteen miles. We were obliged to remain to-day, as the torrents of rain prevented our stirring, and we found the inconvenience of the wild plantain-leafed houses, which let in the rain in every direction.

February 17th. The Naga coolies having run away during the heavy rain of the previous day, we were obliged to divide the party, and leave six men in charge of the baggage. Started at 11 A. M. and ascended to the deserted village Ekkenja, which I intended to have reached the day before, but had been deterred from doing so by the accounts of there being no water. This village was said to have been attacked by the Angamees some years ago, and the inhabitants had gone and settled across the valley, under the great range. This new village is called Sergi; the road was tolerably good, excepting in some places where it was impeded by fallen bamboos. After gradually

descending we reached a small winding stream, over which we crossed several times, and which ran through a fine flat country composed of rich reddish clay, and lightly covered with forest and the very large Kakoo bamboos. Passing over the plain we came to the Támákee, or as it is called by the Assamese, Dhunsiree, a good sized river flowing in a northerly direction, but the depth was not very great; indeed none of the rivers I had met with were very deep, and the shallowness of their banks leads one to imagine that no considerable body of water remains in them any length of time. The Dhunsiree was filled with round stones, and an opening in the great range to the south from whence it flows leads one to believe that it originates at some distance within the range. After quitting it we almost immediately ascended a middling sized hill, which we passed over and ascended to a small streamlet. Bordering it we came to the hill on which Kareabonglo is situated; it is of a moderate height. Ascending it we found the village deserted, and the guard who had gone on with grain snugly stowed away in a capacious house; the Semker coolies had dropped their loads and run off one and all. Kareabonglo is a Naga village of about twenty-five houses, on a hill that commands a good view of the surrounding country, as also of the two villages called Galaga and Harapalo, of about equal size. These Nagas, who speak the same language as the Cachar Hill Nagas, are quite distinct from the Angamees, who speak a different language, and would rejoice in the subjugation of the Angamees, who force them to give them conch shells and other things to purchase the preservation of peace. The chief Kaptoa, to whom I had given presents, brought us grain, for which he was duly paid; other chiefs who brought any thing had the money always tendered to them in payment; some however refused it, but when I told them it was our custom, they carelessly took the money as if it was not of the least value to them; some again indignantly refused. The view from the place last described was good, the huge range of mountains one mile to the southward stretching out in a north-east direction, and apparently terminating in large mountains. On the north-east were two hills heavily clothed in dark green, to the west the same, but broken by a plain or two. To the north, the first part was the same description of country, till an opening in a distant ridge of hills brought to view an extensive plain, which is Toolaram Senaputtee's country: a mist generally hung over the land, which was against any distant prospect being obtained. The Cacharee coolies that had accompanied us from Semker, under pretence of going to dine by the stream-side at the bottom of the hill, ran off, and left us with-

out any coolies at all, situated on a mountain, and in a sea of forest and hills; some of the same tribe of men who accompanied the Shan detachment served them the same trick. The Shans therefore left their grain at Kareabonglo and pushed on for Beren.

The chief here promised to give us thirty coolies, which added to those the interpreter had brought up with the baggage, and the guard that had been left behind, enabled me to carry eight days grain.

On the 21st February, left Kareabonglo, having been detained for the want of coolies three days. At 10° 35′ A. M. by a good path went over some undulating ground, and then gradually ascended at 1 P. M. to the Dádákee stream, which is about forty yards wide, with fine clear cold water gushing through large round pebbles; it falls into the Támákee or Dhunsiree. Ascending, we went along by an excellent path till we came to the Inchurkee river, another stream of nearly equal size to the Dádákee, discharging itself into the Támákee. Passing it we had alternatively good and steep paths till we had passed over a plain and up the bed of a rocky rivulet. We then ascended and passed over the hill on which Umbolo, or Juckong, is situated; we left this village out of sight on our left, and encamped in very good huts, erected for us by the chief Okonah at 7 P. M. Umbolo consists of about eighty or a hundred houses. The Nagas hereabout are a much finer race than those of the Cachar Hills; and the colour of the eastern Nagas is a much more wholesome brown than of those in the vicinity of Goomegogoo, who are more of an ochre colour. The chief brought down eggs, &c., and relieved those men who had come from Kareabonglo by another band. He seemed quite delighted at the idea of the Angamees, the tyrants of the Hills, being put down; and collected twenty maunds of grain for us, which however we could not take with us as we had no porters. I was informed by a Muniporee (who had been captured whilst young, and sold to a Naga of this village, and had married a Naga girl) that there was a road from this to Assam in five days viâ Sumoogoding. The distance from this to the village we had left (Kareabonglo) is about 12 or 13 miles, and there are a good many hills to go over.

February 22d. We left at 10° 20′ A. M. and crossed a small stream, and an hour afterwards ascended the great range to the village of Unggong, from whence a most commanding view is disclosed of the low hills up to and beyond Tooleeram's country, with the course of the Dhunsiree or Támákee. The hill on which stands Sumoogoding is plainly visible, as also the whole of the Angamee valley, and partially grass covered hills. The people of this village treated us civilly, and collected grain (rice) for us of a very good kind. The village consists

of about sixty houses, on the top of a very high hill joining the great range. I went into their village, the people were a little frightened at first, but afterwards they came round to look at the singularity of our dress and difference of colour. They were very much astonished at the whiteness of our cloths, they indeed are in a most primitive state of nature; the road went at the back of their village. We halted about an hour afterwards on the banks of a small stream having passed the Unggrongrow river at the base of the hill the village stands on; it falls in the Támákee, at a distance of one day's journey from the village in question. The distance to-day was only six miles, owing to some of our Semker coolies (who had joined us at Kareabonglo) having run off on the way.

February 23d. Left at 8° 5′ A. M. by a tolerable path, and entered the great range which we had hitherto skirted, and went up and down hill till we suddenly diverged from the continued forest to a most noble opening, which disclosed to our view an extensive valley surrounded by partly cleared mountains, with topes of firs, these were in solitary groups and in ravines; the large village of Beren appeared on the summit of a high mountain across the valley. The encampment of the Shans was visible on a knoll below the village. On arriving nearer to what we supposed to be cleared ground, we found extensive wastes of low grass, such as is met with in the Kassyah hills. Winding over several ravines, and passing a river flowing south, we met the Mohurrir, Ram Doss, and a party of Shans who had come out to meet and warn us to keep together, as the Angamees had the night before attacked them and wounded one man, and were prowling about in parties to catch stragglers.

On further inquiry, I was sorry to find that it was through their own very great neglect, and to their total inattention to the warning I had given them, to keep their bayonets fixed on guard and sentry duties, that one of the party, the Shan sentry, was speared in the leg. I believe there were ten or twelve Angamees about the camp, and two of them crawled up through the grass at 12 P. M., and actually speared the sentry who was sitting down, and most probably asleep. After being speared he attempted to fire his fusil, but the powder being damp it missed fire, whereupon he had time to butt him, but the Naga forced himself away and ran off; the second sentry came up and fired, but missed; had the bayonets been fixed, the fall of the Angamee would have been inevitable. I found the camp built on the remains of an old circular fort, erected formerly by Raja Krishna Chunder of Cachar, who was driven out of the country by famine, after losing one or two men by the spears of the Angamees; he came

up to revenge the attacks made on his subjects by those banditti. He brought up a long ten or twelve pounder to frighten these wild people with, but he found an enemy that made his great gun useless, and was obliged to leave it behind in the jungles. The chief of Beren, Iquijimpo, was most accommodating, and offered to sell the old cylinder for one hundred rupees. On arrival, finding the dried grass around the stockade had not been removed, I set fire to it to save our enemy the trouble of doing it for us, and had the good fortune to drive the fire away from three sides of the stockade, when deeming all danger passed from the fourth side I left some persons to finish what I had begun; but from carelessness, or a sudden gust of wind, the fire spread, and the cry of houses on fire, soon made me aware of what had happened. I seized first the magazine and placed it out of danger, then the grain was all removed, and just as the last bundle was rolled over the paling the flames devoured the store house. A little cordage was burnt, but no material accident or loss occurred, and all parties behaved very well. The troops were drawn up in line after the removal of the stores, ready to have repelled any attack the enemy might have made. I sent up to the people of Beren, who were all assembled on the height, to come down to re-build the camp, but they would not do so; I therefore sent up some Shans to fire a few shots to frighten any wandering Angamees from the neighbourhood, when the Beren people came down and re-built our camp on the ground of the circular fort. This fort was a raised knoll of earth, built up with stones to the height of three feet, with a gradual slope all round. I was perfectly astonished at the fine athletic mountaineers we now had to do with, and was much amused at their accounts of the Angamees. The chief of Rassam and Sarralo who had met us at Umbolo came down from the village, and in a most mysterious manner pointed to the stream and said the Angamees had poisoned it; I replied with a smile, and the gravity of his countenance ceased. I imagine the Angamees had instructed him to try and frighten us out of the country by some such story.

The two chiefs also hinted at the retreat of the Cacharee and Munipooree forces sent against the Angamees, and the absurdity of our attempting it. In fact they tried in every way to talk us over, and boasted of their superior cunning in the most barefaced and at the same time ridiculous manner. The evening we arrived, suspecting the Angamees might favour us with a visit, I remained close to the sentries till 10 o'clock, when the jingle of a shield in the jungle warned us of the vicinity of our enemy. I foolishly fired a couple of shots in the direction of the noise, which drove the Angamees away; had they not been thus alarmed, and had they approached, we might

have then punished them for their intrusion at such unseasonable hours.

They remained in the neighbourhood all night, but deeming it waste of powder and shot firing at sounds, I directed the sentries to adopt a rather primitive mode of letting them know of our watchfulness, and that was, to pelt stones into the jungle when they heard any thing in it, and only to fire when they saw their enemy; this order had a very good effect, for the enemy remained at a distance all night, and retired before day-break. Whilst at this place the chief of Gopelo, a larger village than Beren, came to pay his respects in order to prove that he was friendly; the chiefs of Moolookee, Jalooka, Báláka also came. The jealousy existing amongst the different villages is very great, and after the Beren people had built our huts, they said—"There's such a village has done nothing, make them build the railing." On the 26th the brother of Impuisjee, one of the two greatest chiefs of the Angamees, came to the village of Beren, but would not come down to the camp until I had sent Ram Doss Mohurir accompanied by a Naick and five Shans and the interpreter to assure him on oath of his safety, and to receive his oath of amity in return. On seeing the party approach however he ran off into the jungles, notwithstanding the chiefs of Beren and Rassan were with them, and assured him that nothing would be done to him. The Shans were then left behind, and Ram Doss went out to meet him, but he objected to the sword and shield the Mohurir had with him; these being left behind he came close, and the oath was taken in the following manner—A chicken was produced, the head of which the Mohurir held, and the Angamee the body; they both pulled till they severed it in two, which was to signify, that if either was treacherous his head would be divided from his body in the same manner. They then held a piece of a spear at the ferule end, which was cut in two, and each retained the bit in his hand;—this is one of the most sacred oaths amongst these wild men. The chief then came down to the camp, and I assured him that his brother need have no fear for his life, if he would come in, and swear not to molest the Honorable Company's subjects any more. He agreed to every thing proposed, and volunteered on condition of their lives being spared, to pay a tribute of ivory, slaves, &c. He said his brother had gone to fetch the articles referred to. I showed him a watch and a telescope, and told him I could see every thing he did in any villages, and after frightening him by firing at a pumpkin, I gave him some presents and dismissed him. I waited till the 1st March for his brother's coming, as also for grain from Semker, but neither arriving, I got coolies from Beren and started for Báláka, a vil-

lage six miles on our route, and to which the Beren people had agreed to take our traps and the little grain we had. The road was good the whole way, with only one or two hills. We encamped on a flat piece of ground near a well below Báláka, which is always built near villages for the cattle to drink out of. The chief of Ungolo came in with eggs, &c. and said his young men had joined Ikkaree in the incursions into the Cachar Hills; that they were forced to go, but should not do so again. The term 'youths' is applied to all able bodied villagers. I deemed it needless to bind the smaller chiefs, who stood at the beck of the greater ones, to oaths they could not keep. The chief of Jykama (or as it is written in Captain Pemberton's map of the North-east frontier, Yueékhe) sent in a person of his village to know whether his coming in would cause the loss of his life; I assured him that we were most desirous for peace, but that his not coming in would be a sign of his enmity, and that in that case I should attack his village; the chief departed quite satisfied.

March 2d. I was unable to move for want of coolies. I this day got intelligence of Doorgaram Subadar and of the levy having come to Beren according to order, with forty Kookees out of one hundred who had arrived at Semker. The chief of Umponglo came in, and said Impuisjee, the greatest chief of the Angamees, who had promised to meet me, had gone to Umbolo, or Sirchong, to ask advice of the chief of that village regarding a meeting with me. This chief is his nephew; he promised to give us grain as we passed his village, he also said the children of his village had gone in Ikkaree's train to the Hills, but that they would not do so again. Ikkaree is the second chief of the Angamees, and the principal leader in the predatory attacks on the Cachar Nagas; he was captured by Doorgaram Subadar in one of his incursions to Goomegogoo, but escaped, as he said himself, by the neglect of a burkundaz. Our grain being all expended, and finding none coming forth from the villagers, I placed the chief of Báláka in arrest, to induce them to exert themselves for us, but my experiment had a very opposite effect, for they all fled from the village and left their chief to his fate. On his taking an oath to bring coolies and grain, if I let him go, I released him, which was another kind of experiment, and proved something like letting go a newly-caught bird, for we never saw him again. Doorgaram Subadar came up to-day.

On the 3d March I was obliged to divide the party, as it was necessary to increase our rate of going onwards, or to return, for every moment reduced our supply of grain. I therefore left the Shan and levy detachments under Doorgaram, with instructions to make the best of his way after me, or otherwise to act according to cir-

cumstances, and return if he was obliged to do so; as I had determined to push on, and if nothing else could be done, to find the exit from this tract to Assam, of which I had heard from Toolaram Raja and the Munipoorees. Notwithstanding their ignorance of the existence of a road pretended to by the Nagas, with only one day's provisions I started for Malhye, a village six miles off. I had no guide, but trusted to a path which the Báláka people had pointed out before they ran away as the direction to be pursued. I was rather anxious about meeting any villagers at Malhye, imagining that the Báláka people had communicated our having seized their chief. We found the Malhye people assembled and prepared to protect their village had there been any attack from us; but with a hog and some grain laid at the entrance we pacified them, and got what we wanted. It was rather amusing to see them assembled with their spears, looking very fierce and warlike, whilst we were aware one shot would have sent them flying over hill and dale, and proved to them their weakness. They are however very persevering in their mode of fighting, viz. wandering behind bush and stone, on the look out for an opportunity to spear their enemy when off his guard. Whilst standing making inquiries for a convenient encamping place, Keereebee, chief of Jykama, or Yueekhe, bounded down the hill side and presented a piece of cloth and a spear. A finer specimen of a wild mountaineer was never before me; he wore the blue kilt, ornamented with cowries, peculiar to the Angamees, which set off his fine, powerful figure very much. I told him to come to camp and receive some presents, which he did; but he refused to accompany me to Ikkaree's village, as he said he was at enmity with that chief, and if he caught him he would kill him.

March 4th. Lookakee, chief of Unggileo, came to pay us a visit, and left us to get some grain ready. Healuckeng, chief of Ungolo, came and gave a black cloth as an amicable offering, and brought some coolies to relieve our Kookees; the men he brought were all fine strapping fellows. Left camp at 7° 30′ A. M. and ascended to near the Ungolo village, which consists of about 30 or 40 houses situated on the top of a lower hill of the great range. We found two baskets of rice at the path leading to their village; the path from this was newly cut, and therefore not a good one. We skirted the great range, which from Onggong took an easterly direction. We met with no bamboos, our route being through forest trees with small underwood. We passed the bed of a mountain rivulet, which was now hardly trickling sufficient water to allow of a good draught, but which in the rainy season must discharge a considerable body of water, and going over several low hills reached Unggililee, where the coolies from Ungolo dropped

their loads and ran off. We got a couple of baskets of rice from the people of the village and a small pig, but the total of to-day's supplies was not more than sufficient to allow of half a seer per man, and all the salt had been expended, which made the privation greater.

March 5th. Sent the Mohurir Ram Doss to the village with ten Shans who had accompanied me, to get some rice; but the people assembled with spears, and said our intention was to burn their village; but on being assured that we only wanted rice they gave some, though a small quantity, and we marched off. At 9° 50′ A. M. went over a hill and ascended to Umponglo, the chief of which seemed very friendly, and offered to accompany us and bring Ikkaree to terms, which offer I gladly accepted. We had some difficulty in getting sufficient rice to admit of each man's getting his half seer; we succeeded only by hard pressing, and remaining under the village for some time. We descended thence and passed a good sized river, flowing in a northern direction towards the Tâmâke into which it falls; it is called here the Unnuruce; passing it we ascended and came to a fine flat space of clear rice land, on the top of a hill; winding over several heights we descended to a small stream, on which we encamped in rather stony ground.

March 6th. Broke ground at 5° 45′ A. M. and went a short way through the forest, when we came to a wide rocky space with scattered jungle, apparently the course of a considerable body of water in another season, but now confined to a clear stream of little magnitude; on its right bank there is fine encamping ground amidst topes of the large Kakoo bamboos. We passed no less than four or five streams in the course of our journey this day, and ascended a very high hill on which were the remains of an old village. The great range became more broken in its regularity here, and we ascended over several hills and reached the valley beneath Tukquogenam, a village of about sixty or seventy houses, written in Captain Pemberton's map, Takojunomnee. We encamped in a triangular-shaped rice cultivation, which was raised by steps (the highest about thirty feet) above the level of the valley, for the purpose of retaining the water to nourish the rice crops. Through the centre ran a clear rocky stream of about twenty or thirty yards broad, with which they could irrigate at pleasure. On our arrival we found Bahoota, a lad who called himself Impaisjee's nephew, but who was merely an adopted son of that chief, and who had promised to bring in Impaisjee and Ikkaree at Beren, but broke his promises as easily as he made them. I had fortunately taken the precaution to send the interpreter with the chief of Umponglo before us to calm any fears the villagers might have had, and lucky it was I did

so, for they found them all ready to fly at the first signal of our approach. The chief and his two sons came and brought eggs and grain, not more however than would allow of the old allowance of half a seer. They informed me that the head man of Ikkaree's village was up in their village and would come down if I would not molest him, which being guaranteed he came down and offered a spear, and said Ikkaree was most anxious to come to terms, but feared coming to camp from dread of being seized again, which I assured him would not be the case, and that he might depend upon our word, as it was our custom to act as we spoke, which appeared to satisfy him, and he departed with a promise to bring Ikkaree the next day.

March 7th. Sent our Cachar Naga interpreter with the Tukquogenam Angamee interpreter to Cheremee to fetch grain, which he succeeded in getting, to the delight of the coolies, who had had none the day before. He informed me that at the village he had met with two men from Sumoogoding, whom he wanted to come and see me; but they replied, that a body of troops were on their way from Dhejna, and that they must return to their village to get grain ready for them. This fable served my purpose most admirably, and I told them to tell Ikkaree that if he did not come in soon, I should give him no terms, but advance and burn his village directly the Dhejna troops arrived. This threat brought him to the village of Tukquogenam, and a promise to come down and accept terms next morning. The people of this village had the insolence to say they could drive us out of the country, but they feared the other troops that were coming from all directions to attack them.

March 8th. Ikkaree sent word to say he feared coming into camp, on which I sent the Mohurir Ram Doss and the chief of Umponglo, who had been trying to allay his fears. They returned after about an hour's absence, and said they could not persuade him to come down to camp, but that he would meet me half way between the village and the camp. Seeing that we had no grain for that day's consumption, and fearing that if I should be obliged to attack any of their villages I should only be put in possession of an empty place, as all the grain had been previously secreted in the jungles (as indeed it had been in those we had passed, for they had long been aware of our coming) I determined on going to meet him in his own den. Placing a pistol in my pocket and a sword by my side, and giving a pistol to the Mohurir, I sallied forth with an Assamese Mohurir to take down the questions and answers; a quarter of an hour brought us through an open vale to five or six men watching on a slightly rising ground, beyond them were more men scattered about in an open plain or dale of

about five hundred or six hundred yards wide; in our front stood the village on a hill, behind which were the high peaks of the great range; on our left were more low hills, and on our right, a wood with a river behind; in the centre of the plain there was a stone Chubootar to which I advanced and sat down. I then perceived Ikkaree, whom I knew immediately by the red collar round his neck edged with human hair. I had heard that this was the distinguishing marks of these chiefs, from their villagers. Ikkaree was sitting on a heap of stones ready to fly up the hill, if there was occasion; he did not however come till after many calls from his people and my threatening to return, when he came up rather sulkily, with a red spear in his hand, which I commanded him to leave behind. This being done, he came along cautiously and sat on the Chubootar, continually looking behind for a clear coast for a bolt, and had I given but a single halloo, he would have been off like a shot; his own men even abused his timidity. On getting a little confidence he commenced boasting of his cunning, &c. which I soon stopped, by telling him that if I chose at that moment I could walk him off to the camp, but that I had promised him safety, and that he need have no fear; on this he seemed very anxious to depart, but I made him take oath not to molest in future the Honorable Company's subjects, which ceremony was administered in the most simple and the rudest manner, for it merely consisted in his holding one end of a spear and I the other whilst it was cut in two, each retaining his bit. Ikkaree was wanting to be off before it took place, but I made him remain, and thrust the bit of iron into his hand when half cut, and made him hold it till it was cut through, so that he might have the full benefit of the sanctity of the oath;—it is considered one of the greatest oaths amongst these savages. He promised to send rice next day, and departed much like a jackall, looking round every second step. He is a fine specimen of a brigand, tall and slight, and made for activity, of a brown colour; he has small black eyes, in one of which there is a cast, black whiskers and mustaches, and a savage sneer always playing on his lips. He is at variance with many of his own tribe, and is a most cold-blooded murderer; he wore on his neck a collar made of red coloured goat hair, and ornamented with conch shells and tufts of the hair of the persons he had killed on his expeditions. I returned to camp, and the Tukquogenam people brought us rice, but said they could not afford any more.

March 9th. Bahoota came down, and said something about Impaisjee having arrived, which proved false. On the Mohurir Ram Doss going up, he reported that he had met the interpreter on the road, who feared to go up to the village as there was a body of men

on the road who threatened him; Ram Doss however went on with Bahoota and the interpreter, and met 200 men armed with spears, who attempted to obstruct the passage, but Ram Doss pushed on, and they retired. Ram Doss said they belonged to Ikkaree, and that that chief had sent word to say, he would give us grain if we went to his village, but that he would not, or could not, send it, (as he had promised to do) if I did not move forward. My chief object being accomplished, viz. that of settling affairs amicably, and discovering the locality of these brigands, moreover having found the exit to Assam, viâ Sumoogoding, and deeming it a rather dangerous experiment remaining any longer in a country where the roads ran chiefly in the beds of rivers sure to be stopped up in the rains, which had already commenced on the upper parts; doubting also the word of Ikkaree to supply us with grain, and the consequent likelihood of a quarrel had we gone to his village, I determined to return.

* * * * * * * * *

We had not a grain of rice for that day, so I marched off towards Sumoogoding, where it was most likely we should get provisions, that village being in communication with Toolaram's Cacharee subjects at Dheghna, leaving a message to the two chiefs Impaisjee and Ikkaree to the effect that, as they had taken oaths not to molest the Honorable Company's subjects I should not trouble their villages, and hoped they would attend to their oaths. We left camp at 9 A. M. and by a very good path reached Cheremee at 11 A. M. it being about five miles from Tukquogenam. It is a small village of about fifteen houses, situated upon a middling sized hill; the silly people assembled to prevent our going into their village, armed with spears, little imagining that one volley as they stood would have blown them of their hill. We pacified them, and got a little rice, but it not being enough, I threatened them if they did not bring more to camp, to return. From the hill several other villages were pointed out to the east, but I did not observe them, Papamee, and Jingpen were among their names. The great range seemed to take a turn to the south of east from beyond Tukquogenam. The directions of Moongjo and Sookamjo were also shown, the former a village of Ikkaree's, consisting of five hundred houses, and the latter belonging to Impaisjee of eight hundred houses.

Leaving Cheremee we descended to a small river bearing the Naga name of Ompoa; we continued down its bed for about a mile, and then encamped on its left bank in a newly burnt jungle, opposite the village of the same name, which stood about a mile off on a hill, and was hid by the tree jungle. In the valley we were in the huts had

just been erected, when a lad belonging to the Shans came running in breathless and said he had seen two Nagas with spears and shields. I immediately took a couple of Shans and went out in the direction, but only met a couple of sepoys and coolies cutting wood. Returning and recalling all stragglers, I found the chief of Umpoa with grain, which greatly relieved the spirits of the party, as there was a good chance before that of their going without their usual allowance. I gave him some presents, and he returned to his village. About an hour afterwards, it being evening, the men were all cooking in the bed of the river, when two Nagas sneaked up through the jungle from the opposite bank and threw two spears at the right flank men, one of which lodged in the thigh of the dhobee and the other grazed the skin of a sepoy; the Nagas instantly fled, and several shots were fired in the direction they had gone, which was all that could be done, as evening was too far advanced to pursue them. Our Tukquogenam guide, who had promised to show us the road to Sumoogoding, said that it was the people of the village of Pepamee and Cheremee that had attacked us, but I very much suspect that Ikkaree was at the bottom of it, and fearing for his own village he had ordered these two small villages to annoy our return; but it is very difficult to speak with any degree of certainty, as the Angamees are all in clans, and each village is its own master as long as its doings do not affect the great chiefs. As far as I can learn in regard to the two great chiefs, Impaisjee, who is the greatest, is wishing for peace, but his more adventurous countryman, Ikkaree, is unwilling to give up his predatory habits and his attacks on the Cacharees, who yield him much plunder in cloths, conch shells, &c. besides what he forces them to give to release any of their relatives who may have been captured in an inroad, and also to ransom any skulls of their relatives;—for leaving the latter in the hands of the enemy is considered amongst the Nagas a very dishonorable thing.

March 10th. The chief of Ompoa came down, and said the Nagas that had attacked us were of the villages of Papamee and Cheremee, but I suspect the people of Cheremee, the village we had left behind, were the parties concerned. The night was extremely stormy, it rained heavily and thundered and lightened, but our leafed roofs luckily did not leak. We heard the Nagas around us the whole night trying to sneak up, but a shot drove them off in a great hurry. They are very much frightened at the report of fire-arms; they follow their enemy with great perseverance till they wound or kill one or two, when they run away. We left this early, and followed the course of the river for about eight or nine miles, and then ascended the high ridge on the

summit of which Sumoogoding is situated. The stream was joined by another river called Omporo, which increased its width towards the end of the journey. Some Nagas were observed to follow, but on several men detaching themselves to go after them, they fled in all directions. The chief of Ompoa accompanied us, as also Bahoota, as far as the Sumorginding ridge, where they left us. The weather was very threatening, and as we ascended the ridge the clouds lowered and rolled through the opposite high range we had left, and we expected to have been deluged before we reached the top; however it cleared off and we ascended, but met a fierce looking foe in the shape of the villagers of Sumoogoding drawn up in battle array to resist our ingress into their village. We found many who could speak the Cacharee language; these were informed of our only wishing for rice and a convenient locality for our camp, and on this they showed us the road across the range, and from it, a most extended view is laid open of a vast plain to the north, (which greatly pleased our inhabitants of the plains, who were sick of mountain life) and on the south, of the whole Angamee valley and mountains; we then descended to a small nullah under the north side of this range called Narrow, and encamped on its bank. We got enough grain for the party to allow of half a seer for each person, the chief however did not seem much inclined to give us the quantity we required to take us to the end of our journey, viz. three days. Next day he brought only one maund, and said he could give no more, on which I sent the Mohurir Ram Doss with ten men and a Naick up to the village with the men who brought down the grain, one of whom however I took the precaution to retain, as the Cacharee interpreters had not made their appearance, according to promise, and in case we should require to force grain out of them and have a dispute, and thus obtain no guide. The party returned and said they could not get any more grain, and that the Nagas who had followed had come into the village, and were only prevented from attacking us by the villagers, who were afraid of our burning their village. Taking twenty-five men under the Jemadar, and the Kookee coolies, and leaving the same number under the Subadar, who had been ill since our leaving Semker, to protect the baggage, I proceeded up to the village, which I found empty, but saw parties of Nagas scattered about on the neighbouring hills, and the villagers in a small stockade on the crown of a hill beyond the village. Finding plenty of grain, I set the Kookees to work to clean it whilst I attempted to get the villagers down from their citadel, but to no effect. After some grain had been beaten out we observed some Nagas attempting to sneak through the jungle up to us, but as I was unwilling to injure

made from rice flour and Bajara seed. Their main street is a receptacle for all the filth and dirt in the place, and is most offensive. In front of the houses of the greater folks are strung up the bones of the animals with which they have feasted the villagers, whether tigers, elephants, cows, hogs, dogs, or monkeys, or ought else, for it signifies little what comes to their net. They have very fine large straight backed cows and buffaloes; they have also goats, hogs, and fowls, but no ducks or geese. On each side of their villages are stockades and a ditch, which is filled with *Pangees*, or pointed bamboos, and on the sloping sides of the ridge the earth is cut away and a wall built up; these fortified villages would make a formidable resistance to any force without fire-arms, but they are generally overlooked by neighbouring heights, which disclose the whole interior economy of the place. They cultivate rice in the valleys between mountains, and several other kinds of grain (names unknown) also a very fine flavoured kind of purple vetch. I was informed that cotton did not grow in the higher mountains, and that they got what is procured from the lower hill Nagas. The peach tree grows in a most luxurious state round the different villages, I also saw an apple tree off which we got great abundance of fine large wild apples, which were greedily devoured by the whole party. The Angamees get all their iron instruments from the Munipore Nagas; they are great wanderers, and make incursions into Munipore itself, and carry away children, who are sold up in the Hills. I met several who had been seized in that manner, and who had adopted the wild Naga customs, and were unwilling to return; Semker is a great mart for this kind of trade. The Angamees have no idea of ploughing or agriculture, or of preparing the ground, and sowing crops, in the way civilized nations do. The poorer classes make their cloths from the pith of a nettle which is procurable in great abundance, and which makes a very fine fibred hemp. The bay leaf is a native of the higher mountains, as also a small species of wild orange. The country between the Sumoogoding ridge and Dhejna is remarkably fine, particularly so on the banks of the Dhunsiree, which much resembles the species of forest scenery found in America, and remains uncultivated only from the fear that is entertained by all the ryots, &c. of these wild Angamees. The Dhunsiree, I should think, would be navigable for canoes at parts of the year up to the point I crossed it.

ART. II.—*Report by Lieut.* JOHN GLASFURD, *Executive Engineer Kumaon division, on the progress made up to the 1st May, 1839, in opening the experimental Copper Mine in Kumaon.*

The ground selected for the experiment is at Pokri in the Pergunnah of Nagpoor in Gurhwal, where mines of Copper have long been worked.

The mines, or rather excavations, are numerous, and are situated on the western side of a steep hill in talcose schist and clay slate. The soil is extremely soft and decayed, and has defied all the efforts of the present race of native miners, according to whose accounts the workings do not extend beyond 120 feet from the entrance in any of the excavations, which are constantly liable to accidents, and of which a new one is generally commenced after every rainy season. It is however universally admitted that the Pokri mines have been very productive, and it is said that the one known by the name of the Rajah Kāṇ, yielded one year upwards of 50,000 rupees. Judging from the ruins of the houses, workshops, &c., and the accumulation of slag, the working must have been carried on, on an extensive scale.

The village of Pokri is situated about 6,100 feet above the level of the sea, and 3,800 above the Alukmenda river, from which it is distant nearly nine miles; the distance from Almora is eighty-six, and from Sreenuggur little more than thirty miles, and to both of these places there are good roads. The climate is good but changeable, owing to the vicinity of the Snowy range; and the temperature is from the same cause as cold as that generally found at elevations from 7,000 to 7,500 feet. The vegetation, as might be expected, is European in its character, and the forests of oak, rhododendron, and the common long-leaved pine are almost inexhaustible in the immediate neighbourhood of the mines. During the greater part of the year there is water sufficient for washing the ores in the immediate vicinity, and at a distance of about two miles, there is enough for the purposes of machinery throughout the year. The village consists of eighteen to twenty-two houses, and from sixty to eighty inhabitants, who are chiefly of the Chowdry and Mining castes. The right of mining was rented by them from Government on a quinquennial lease of 100 rupees per annum, which expired about a year ago; but the people are so poor, and their resources so limited, that they have been unable to undertake any new lease, and indeed before the present experiment was commenced they hardly attempted more than the re-smelting portions of the slag from the old working.

six miles the path is very circuitous, winding round the bases of several hills, there are many water courses, and the number of loose stones of all sizes strewed about, render it very painful to travel over. The Saul forest is very dense, and there are some very fine timbers, it continues so for five and a half miles. Our course thus far had upon the whole been north-easterly, we here turned to the southward, in which direction we continued for a short distance, and crossed a shallow running stream called Jurrítoora, flowing to the right; we then came upon an open spot in the centre of a beautiful plain, with fine mango topes around it; this is a Bunjara halting place; there was formerly a small hamlet close by, but during the disturbances between the Raja and the Sumbulpúr people, some years ago, it was destroyed. Half a mile further forward the same rivulet is recrossed, the road then turns to the eastward, and together with the stream passes through an exceedingly narrow defile, called Juraikilla, into the valley of Deogurh; the hills are exceedingly high on either side, those to the left (or north) have faces nearly perpendicular. There are the remains of a stone wall and of a stockade, by means of which the Deogurh people are said to have often successfully defended themselves against their invading enemies.

On passing the defile the valley appears in all its beauty, extending west to east as far as the eye can reach, widening with a perceptible fall in that direction which is towards the valley of the Brahmení river, into which the Jurrítoora rivulet empties itself, after winding along the valley at the foot of the hills skirting its southern boundary. The view from the pass, looking east, is exceedingly beautiful, indeed nothing could be more grand. About two miles in advance, I came to a large village called Kainsur, between which and the pass I had thrice to cross a large nullah and several smaller water-courses, over all of which it would be necessary to have bridges. After resting a little, I continued my journey, and passing several large villages, including old Deogurh, reached the modern town of that name, distant 13½ miles from last ground. I found a large red and white tent ready pitched for me by the Raja's orders, and an abundance of supplies had been collected; this civility was quite unexpected, but there was probably a reason for it.

Deogurh is a large straggling village, distant one mile from the hills on the northern side of the valley, which may here be about two and a half miles wide. The Raja's *Noor*, or palace, together with some small temples are the only pucca buildings; there are small water-

courses or aqueducts passing through every street and garden, the water being conducted from the famous cataracts which is in the hill just above the town; the fields for several miles are irrigated from these falls. I was too much fatigued on my arrival to look about me, added to which it was late in the day.

Although the apparent comfort of a tolerable good tent was thus provided, I had more reason for anger than pleasure, for I had sent on part of my guard and the Political Agent's Muktar (an Ooriya)—who had been so officious in attempting to prevent my coming by this route—to have a bower prepared in some shady spot, distant at least two miles from hence, and had given most positive orders on this head; for in the first place, I wished to avoid an interview with the Raja, travelling in the uncomfortable manner I was forced to do; secondly, I wished to put it out of the power of my followers to extort money, "*Salami*," from him, a regular practice with native servants of political establishments, particularly with the worthies of Cuttack, two of whom accompanied me* on the present occasion. This kind of systematic plunder is perhaps one of the chief causes of aversion the inhabitants have to our making a thoroughfare in their different states.

I suffered more from the heat this, than on any of the previous days of my journey, but towards 3 P. M. a severe north-wester came on, followed by a heavy shower of rain, which cooled the atmosphere for the time being, but the steam from the wetted ground rendered the heat at night nearly suffocating.

The Raja paid me a visit at 5 P. M. he is a fine handsome lad, of about eighteen years of age, but rather effeminate; he does not appear to be very wise. He expressed great anxiety about the new road, and begged I would not bring it through Deogurh, as there were (of course) other much better paths, but that if I did do so, that Lehragurh and

* When I went on my tour to the Coal Mines of Talcher last year, I was informed, on credible authority, that a Chuprassie of the Commissioner's establishment who accompanied me, had declared that the trip was worth fifty Rupees to him, and that he wagered that he would not make less before he returned to Cuttack. This man subsequently gave me much trouble by his unceasing attempts to lead me by a round-about route through Dhenkennalgurh, Hindolegurh, Ungoolgurh, that he might secure the usual nuzzers which the Raja's offer on paying their first visit; and when he found that I was not to be led, he prevailed upon me to allow him to go to Dhenkennal with the Commissioner's Purwanah, assuring me that unless he did so I should get no supplies or aid; he again attempted the same trick in Ungool, but I prevented him, and suffered no small inconvenience in consequence; yet this man was the most active and best informed person on the establishment.

Keunjurgurh must have the road through them likewise, for it to be at all a straight line; there was more in this sapient remark than meets the eye; part of the meaning is this,—that if he were to have the nuisance imposed on him, he thought that the Lehra and Keunjur Rajas should share it likewise. I was subsequently informed that he had paid a good deal of money to some of Mr. Babington's people and to my own, to ensure their good services in dissuading me from adopting this line.

The Raja when about to leave, let me know through the medium of his "*Spreach sprucher*" that he had a very urgent request to make. I requested him to speak out, when he told me a long story about some Mussulman Saudagurs from Cuttack who were sitting *Dhurna** at his gate, wishing to insist on his paying them some debts of old standing, with compound interest thereon, and that he wished me to interfere in his behalf, as he was about to proceed himself Cuttack to wed a daughter of the old ex-Raní of Sumbulpúr; having no power to interfere I declined doing so, further than recommending the merchants to have patience; I accordingly directed their attendance in the evening, took leave of the Raja, and proceeded immediately to see the falls, where I was told that there were many "*Assura ka hār*" or giant's bones, a denomination generally applied to fossils; so that I proceeded with all haste, expecting a fine harvest. It was becoming dark just as I reached the lowermost basin of the falls, in a beautiful woody recess, the rocks towering several hundred feet above. I never saw a more enchanting spot, the mango and other trees growing to an incredible height. There are five falls and as many basins formed by them; the height of each may be about seventy or eighty feet; the volume of water is considerable. I climbed to the second basin, and there waited till torches were procured to enable me to see the "giant's bones," but, lo! what was my disappointment when I found that these said bones were nothing more than large masses of stalactite in which were fantastic caves. The inhabitants make lime with it, as an ingredient for their paun and betel nut, and their method of burning it is rather singular; some hold a slab of stone with a heap of lighted charcoal against the roofs of the caves; the parts affected by the heat drop off into the fire, which is then extinguished, and the particles of lime separated from the coal. Another

* Sitting *Dhurna* is a common practice with natives who wish to attain any particular object; the custom is, to sit at the door or gate of a person without taking food or drink until the party entreated yields, and should the petitioner die, the curse of his blood is supposed to rest on the latter.

method is this, a few small pieces of the rock are put into a wisp of damp rice straw along with some lighted charcoal, the wisp is then wound up into a ball as tight as possible and tied to a string, by which it is kept swung smartly round until the lime is ready, this the burners know by the state in which the wisp appears. This practice I have observed elsewhere in use in burning the limestone nodules (Kunkur) for the same purpose. But to return to the falls—I could not see much by torch-light though I had several, the glare of which added to the magical appearance of this truly romantic spot; a cold breeze blows down from the upper falls, which the guides assured me never ceased all the year round. There are several fabulous stories connected with the spot, and a large serpent is said to inhabit one of the caverns, which is not however improbable.*

I felt very much inclined to halt and pass a day here, but the rains having commenced, it would have been dangerous to prolong my stay in jungles, I therefore returned to camp where I found the merchants in attendance together with the Raja's people; the former seemed little inclined to listen to any terms short of payment in full of their exorbitant demands; the latter urged the inability of their master to pay more than 250 Rupees out of 3,000 with an I. O. U. for the balance when he should return from Cuttack with his bride, and, what to him was perhaps more valuable, her dowry.

I should here observe that there are many Mussulman and other merchants who come from Benares and Cuttack with indifferent horses and inferior merchandize of kinds, which they pawn upon the ignorant grandees of these outlandish places; they give long credit on promise of interest, and consider themselves lucky if some few years afterwards they realize the amount of purchase money, which from its exorbitant nature, renders ample remuneration for the trouble and delay they are subjected to, sometimes having to wait for several months together, being put off with repeated promises of payment, and as many plausible excuses for non-payment, till at last an order is given them upon the farmers of one or more villages who may be in arrears to their lord; from these the merchants screw as much as they can, the amount of which, of course, very much depends on their power and temper, and

* Mr. Motte in his Narrative describes an enormous serpent called *Nagbunse*, which is worshipped some where near Sumbulpúr, see p. 82, Asiatic Annual Register, Vol. 1. I have been told that this reptile is still in existence, and that the diamond washers make offerings, if they neglect which, they suppose their search will be fruitless.

serious frays are not uncommonly the consequence. Formerly the commissioners and political officers used to interfere and enforce payment to the merchants, but I believe this bad practice has been discontinued, I think that if a few merchants were licensed to proceed into the Gurhjat, previously manifesting their goods, and paying a light tax to cover the expense of a registry of them, and of their fair market value, upon an understanding that the settlement of any unadjusted claims on any Zemindar would be insisted on to the extent of a reasonable profit, much good might accrue, and a great deal more merchandize, both European and country, would find a ready sale with advantage to both parties.

The merchants seemed to agree to the terms proposed, when the motley group retired and left me to enjoy as much rest as the steaming heat and stunning noise of frogs and *chicadas* would allow of.

27th May. I rose at a very early hour, when having dismissed half the guard of the Ramgurh Battalion and that of the 19th N. I. and the Political Agent's Mooktar, whom I had yesterday directed to return to their stations viâ Sumbulpúr by the Baghlot ghat and the road which had been hidden from me, I proceeded on my journey. I walked several miles through a thick but low jungle, along a very good road, to a place called Sonamoonda, where I rested a little to allow the stragglers to come up; thus far my course was a little to the northward of west, having the hills at a short distance to the left, the path then began to wind considerably more than any obstacles rendered it necessary, and upon the whole in a southerly direction. The forest is very thin, with no underwood, and the ground undulates considerably; there are several large nullahs and a great many small water-courses, almost all of which would require bridging. The next place I reached was a large village of *Guallas*, called Korapeeta, situated on an elevated spot in the centre of an extensive plain, on to which the Deogurh valley opens; from hence the ground (still undulating) has a perceptible fall towards the Brahmení river, on the banks of which, at a place called Barsing, I encamped for the day. I took up my quarters in one of several large huts which Major W——'s Mooktar and the guard of the Ramgurh Battalion had had constructed while awaiting the arrival of my predecessor. I have learnt sufficient regarding the oppressive conduct of these knaves to satisfactorily account for the Mooktar's anxiety to prevent my travelling by this route; it appeared that he had passed himself off with the credulous Zemindars here, as the Political Agent's assistant and friend!!—and used to have *dāllīs*, &c. &c. sent

him daily. I felt the better pleased at having dismissed this worthy at Deogurh, for he was more a hindrance than otherwise to my operations.

Barsing has been a large place, but famine, misrule, and cholera have reduced the number of inhabitants to one-half, so that many of the huts are in ruins. The river flows under the village; though its span here is very great the water is shallow, and wends its way in small rills between numerous rocks and islets which every where stretch across the bed; the banks are not more than eighteen or twenty feet high, and are seldom overflowed, so that the river can never rise sufficiently to admit of boats navigating it with safety; this alone would be a sufficient reason to seek for a more favorable spot for the road to pass, which might be found five or six miles either above or below this point, where the banks are steep and rocky, and the water confined to deep and narrow channels, equally well adapted for ferries or suspension bridges; the latter would, for many reasons, be very desirable both on this and other rivers.

I passed this day with more comfort than usual; the hut I occupied was under a cluster of noble mango and tamarind trees, and facing a beautiful shady tope; it was a paradise contrasted with what I had hitherto met with; I could not help reflecting on the truth of an admirable saying of Demetrius, quoted by Addison in the chapter treating of the Providence of God, that "nothing would be more unhappy than a man who had never known affliction;"—a truth deeply impressed on my mind, to which I would add, a similar maxim which called it to mind, "that he who has never experienced discomfort and privation, cannot appreciate real comfort, or know the virtue of contentment." I cannot here refrain from acknowledging the consolation I felt, and the hope of conquering all my difficulties, the frequent perusal of the beautiful chapter above mentioned inspired me with during the severe trials I had lately suffered; many were the times when nearly driven to distraction and despair, its perusal made me happy in my misfortune. Reader, pardon this digression. To return to my narrative. About 4 P. M. a very severe north-wester came on, followed by a very heavy fall of rain and hail, which lasted until 6 P. M.; it cleared before sunset, so that I was able to observe and sketch the features of the country, but could not resume my march, for there was every indication of bad weather. I began to feel uneasy at the prospect of the evil effects of the rain, and I resolved passing the night here, and to push on at all hazards at day-break.

(To be continued.)

ART. IV.—*Notice of a Grant engraved on Copper, found at Kumbhi in the Saugor Territory.—By the Editors.*

We present our readers with another *Tamba Patra* in the original, and with a translation which we have made. DR. SPILSBURY has obligingly presented this valuable relic of antiquity to the *Asiatic Society*. He writes, that "the two Copper plates joined by a ring seal were "dug up at *Kumbhi*, on the right bank of the *Herun* river, thirty-five "miles north-east of *Jabalpoor*, and were forwarded by Major Low, "Magistrate of this district. The letters engraved on the plates are "in great preservation, and from their date upwards of 900 years old, "corresponding nearly with inscriptions in stone in the same character (facsimiles of which were forwarded by the late Major FRANKLIN to the Society). "Something may be gleaned of the period when a large "city existed, only six miles west of *Jabalpoor*, now to be traced by "little more than mounds of bricks and cut stones."

The skill and kindness of Lieut. KITTOE, has enabled us to prepare a plate exhibiting facsimiles of the seal and specimen of the letters, together with a table which shews the alphabet of the plates in juxtaposition with the modern Nagri alphabet. The character of the plates approaches that of the *Rajgarh* slab, of which we published the inscription in our *March* number by oversight.

Lieut. KITTOE's neat engraving was published in our *May* number; to which we refer our readers. The Seal is that of SRI-MAT VIJAYA SINGHA DEVA. The Legend is DURGA in her form MAHA LAXMI supported by two Elephants. At the foot is the Bull of SIVA.

The grant gives us eight generations of the *Kula-Churi* dynasty, beginning with YUVA RAJA DEVA, who was a descendant of the renowned KARTTA VIRYYA of the race of BHARAT.

YUVA' RAJA DEVA
|
KOKALLA
|
GANGEYA DEVA
|
KARNA DEVA married AVALLA DEVI
YASUS KARMA DEVA
GAYA KARNA married ARHANA DEVI
|
NAR SINGH DEVA — VIJAYA SINGH *m* GA'SALA DEVI
|
AJAYA SINGH DEVA

AJAYA SINGH DEVA, VIJAYA SINGH, as heir apparent, by order of his mother GA'SALA makes the grant to the Brahmin SITHA SARMA in the year Sambut 932, or A. D. 876. It is more ancient by 87 years than the *Rajgarh* inscription communicated by Captain BURT.

This grant does not give us any important information. We obtain from it however for eight generations a line of Rajas who ruled in those parts, and it will be observed that a remote ancestor of the grantor married a *Hun*. Unless this be a poetic fiction, it may imply that Hindu princes in remote times assumed some latitude in the selection of wives,—more perhaps than is allowed by the strict law. We presume that the *Huns* were not true Hindus. We have also the designation of the highest officers of Church and State. The high priest,—the chief Confessor—the Prime Minister—the Chief Councillor—the Principal Secretary for foreign affairs—the Chief Justice—the incorruptible Superintendent of Police—and the Chamberlain. The titles given to the ruling prince are most elaborate. Amongst his dependent chieftains are enumerated the *Gaja-pati*, *Aswa-pati*, and *Nara-pati*—titles peculiar probably to particular chieftains. The grant, for redundancy, might be envied by an English conveyancer. The quaintness of some of the old Hindu names may be also observed from this grant. Several of the names are quite obsolete.

The initial verses of the grant are not devoid of merit, but are not so elaborate as the poem on the *Rajgarh* slab.* The perorations of grants of this class have always many verses in common, of which some seem to be *puranik* quotations. These deprecatory and imprecatory verses occur with various readings. We have copied, with alterations suitable to our text, Mr. Colebrooke's versions of a few; one,—the forty second verse—is of peculiar beauty and dignity, and in the translation the classical pen of that distinguished orientalist may be recognized. The imprecations against the resumer are terrific: perhaps they were prophetic. "That rascal who by delusion of avarice, &c."

The inscription was composed by BATSA RAJA *Dasa-Mulika*, or *Dasa*-MULI, the chief Justice who witnessed the gift. We have been much puzzled by this unusual term. It seems to be a title denoting the capacity of the dignitary for business. There are a few orthographical errors in the plate, which we have noticed. They seem due to the ignorance of the engraver, the "smith LEMA."

* See our March No. Art. I.

It may be observed that in this and other grants the grantor gives the property in the soil, and says nothing of holding tax-free. May it be inferred from this, that the Raja was under the old *Hindu* system considered as the owner of all the lands in his dominions, and that where he granted in proprietory right, the tax-free tenure or exemption from rent to the state, was implied as a matter of course?

TRANSLATION.

OM *glory to* BRAHMA.

1. That deity (1) whose navel is a lotus prevails; and so does the lotus his navel. Excellent too is the lotus-born god (2) produced therefrom; excellent is his offspring, that ATRI; and after them excels that luminary beloved by the ocean, who received his birth in the cavity of his eye.

2. That luminary which glides in the ærial expanse, like as it were a swan on a lake, begat as his son, BODHANA (3), the first prince, a son-in-law domiciled in the mansion of the lotus-loved luminary (4).

3. The son of the god, who rules the waters, obtained as his son PURURAVAS,—him whose concubine was URVASI (5), endowed with numerous incomparable qualities and whose wife was URVARA'.

4. In that race was born BHARATA (6). He was enamoured of the earth (*Viswambhara*), lovely by her ornament, the ocean, encircling her as a girdle, and whose pure glory rivetted as it were on the pillars of more than a hundred *Aswamedhas* is proclaimed by the YAMUNA.

5. In his race, excellent is that KARTTA-VIRYYA, that warrior wielding without effort every weapon, as if by second nature. Then he supplied the name of *Raja* (7) to the Hare-spotted luminary, the progenitor of his race.

6. That monarch, the lord of kings (firm as the snowy mount), begat the *Kulachuri* race, distinguished by sovereigns spotless in their conduct like pure pearls.

7. In his line was the king YUVA-RAJA-DEVA, foremost of the virtuous, who had purified his capital like the city of *Purandara* (8),—a youthful lion in quelling of kings the pride, which resembles some vast elephant blind with rage.

(1) BRAHMA. (2) VISHNU. (3) *Alias* BUDHA, the regent of Merury, or the Planet itself. (4) The Sun. Mercury is said to be domiciled in the mansion of his father-in-law the Sun, from his approach to that luminary in parts of its orbit. (5) The celestial courtezan. (6) BHARAT is the king, by whose name INDIA is yet designated, *Bhárata Varsha*. (7) Shining. (8) INDRA.

8. Of that lord of the world, the principal ministers placed on the throne his son KOKALLA, whose expanded armies (consisting of four arms (9)) were stopt by conflict with the four seas ;—

9. Of whom going forth afar, the glory shewed like a forsaken woman, far surpassing white sandal wood ; it reproved the lustre of the moon, and eclipsed a string of pearls.

10. Whose son was GANGEYA-DEVA, the lord of the fortune of the bold,—a falling thunder-bolt on the heads of his enemies,—by his arm, surpassing the length of a city bar. He whose face was decked with smiles, and whose broad chest shewed like an emerald tablet.

11. To whom was dear the abode at the root of the holy fig tree at *Prayag*. When he had obtained emancipation in a better world with his hundred wives, his son KAMA-DEVA reverenced the various quarters by pearls extracted from the frontal orbs of elephants, rent by his sword.

12. By whom was created a pillar in honor of BRAHMA, called *Kurnavati*, as if the mansion of that divinity in this nether world,—the foremost abode of the virtuous,—the root as it were of the twining plant of theology, and the diadem of the stream flowing from heaven.

13. By that lord of the *Kuluchuri* race, on his wife AVALLA DEVI, another LAXMI produced from the ocean of the race of *Huna*, was begot YASASKARMA DEVA, adorned with glory co-extensive with the billows of the ocean, swelling as they did in the doubt of the rise of the luminary who cherishes the hare.(10)

14. Of whose enemies, for an instant, the condition was as if they had repaired to the banks of some lake in the cavity of some great hill, and there perceiving their images in the water like a confronting enemy, they hear the echo of the words "he is come," interchanged in their terror. What beyond this?

15. His son was GAYA-KARNA, of great renown ; whose mistress was the earth stained(11) as if replete with the blood, from the throats of his powerful enemies wounded in war.

16. Eager to expand the canopy of his glory in all quarters, adorned with virtue and robed in majesty,—by whom planted, the thorn of grief rankles in the hearts of the beloved of his enemies.

17. On his Rani, ARHANA DEVI, he begat a son, NARA SINGHA, lord of men ;—as if a sentient effort on volition.

(9) The four *angas* or arms of an army are elephants' cavalry, cars, and infantry.

(10) The play on the words is lost in the translation. The damsel separated from her lover in Hindu Poetry reproaches the moon. This is a strong hyperbole.

(11) A pun is lost.

18. By largesses of gold *(hiranya)* and clothes *(kasipa)* did he shew great love to the learned *(vibudha* (12)*)* and robbed of his pride the god of love, by eclipsing his beauty.

19. Who in the hands of Brahmins placed five or six gifts, in the form of drops of water—and they with these, quenching their thirst, abashed the ocean which abounds in gems.(13)

20. That sagacious king, who extended his popularity, gratified suppliants with presents commensurable with his weight and other gifts.

21. Who not less than PARAS RAM (14) produces envy,—making the world the dominion of *Brahmins* by destruction of the *Kshatrayas.*

22. His younger brother was the king JAYA SINGH DEVA, served by valiant kings; by whose liberality its glory eclipsed,—RAJA BALI, another heavenly tree, withered beneath the surface of the earth.(15)

23. On hearing of the coronation of JAYA SINGH DEVA, the king of *Gúrjara* deserted his weak kingdom, so also the TURUSHKA; while the chieftain of *Kuntala* neglected amorous dalliance; other kings too *daffing the world aside,* fled beyond the ocean.

24. Of the moon, of whose glory by the light the atmosphere being rendered brilliant, the descending flocks of birds hardly appeared white.

25. Excellent is his son, the king VIJAYA SINGH, a lion amidst his defeated enemies—a ray reposing on the firmament—a sun on earth, adorned by wide extending glories, the abode of amiable qualities, and the shrine of auspiciousness.

26. May she be honored, the illustrious GA'SALA DEVI, of whom,—the sight is as a shower of nectar,—proximity a pure treasure,—and the voice like the rare gem *Chintamani* (16)

Prose.

The chief object of homage—the INDRA of the world—the divinity of dependent kings—foremost of the devout in the contemplation of the feet of VA'MA-DEVA(17)—a god amongst principal and inferior kings—the chief of the devotees of SIVA—lord of *Trikalinga*—lord of the three principalities of the *Gaja-pati*, *Aswa-pati*, and *Nara-pati*—of the victorious VIJAYA SINGH DEVA, the heir apparent prince AJAYA

(12) A double sense pervading this is lost. (13) A preliminary rite preceding gift is pouring some drops of water on the palms of the donee. (14) VISHNU assumed the form of PARUS-RAM to quell the pride of the XATRIYAS. (15) RAJA BALI is celebrated for his liberality. VISHNU, as the dwarf, asked him for three feet of soil which were granted. But the god's expanded feet embraced the whole world. Unable to keep his promise, the king was condemned to hell. (16) *Chintamáni* is a fabulous gem, supposed to yield its possessor whatever may be required—(WILSON).

(17) SIVA.

SINGH DEVA, son of the great Rani convened the following persons,—SAIVA ACHA'RJYA BHATTARAKA, the great minister,—VIDYA DAIVA, the *Raj-Guru*,—the *Pandit* YAJNADHARA the chief *Porohit*,—the lord SRIKIKI, the great councillor, pre-eminent in faith,—the Lord DASA MULIKA, BATSA-RAJA, the chief judge (18) and reporter of state affairs(19),—the lord PURUSHOTTAMA, the principal secretary for foreign affairs(20),—the great chamberlain(21),—the incorruptible superintendent of the police (22),—the treasurer (23),—the master of the horse and elephants,—also other persons resident of the village about to be given. After this, as becometh, he addresses, explains, and orders thus: "Be it known "to you, Sumbut 932, on the anniversary of the age, at *Srimantipuri* "with my assent, by my mother GA'SALA DEVI, who had according to "ordinance bathed in the *Narmada*, and worshipped MAHADEVA for the "sake of augmenting the merit and glory of her parents and self, to the "Brahman SITHA SARMA (the son of CHHITU *Pandit*, grandson of "SULHANA *Pandit*, and great-grandson of JANARDANA *Pandit*, follower "of the metrical veda(24) of the *Sāvarna Gotra*, and devoted to the five "*Pravaras*(25)—BHARGAVA CHYAVANA APNAVAN AURVA JAMA "DAGN) was given, under a grant, the village *Choralaga*, in the "*Patala* of *Sambala*, limited by four boundaries, but exclusive of such "four limits,—together with pasture for kine, water and land, mango "trees and honey, salt-mines, salt-pits,—with right of ingress and egress, "with wilds and marshes, with trees and grass, and so forth rising "spontaneously, *(part obliterated,)* together with woods and forests, "without any let or hindrance. This is the prayer of the giver."

27. RA'MABHADRA again and again exhorts all those future rulers of the earth: this universal bridge of virtue for princes, is to be preserved by you from time to time.

28. And it is said. By many kings, SAGARA as well as others, the earth has been possessed. Whose-so-ever has been the land, his has then been the fruit.

29. He who takes a single tolah of gold, a cow, a finger even of land, abides in hell until the general annihilation.

30. The resumer of land is not expiated by one thousand pools, by a hundred sacrifices of horses, by the gift of ten million of kine.

31. He who resumes land, whether given by himself or by another, is born an insect, in ordure, and sinks with his forefathers.

(18) Mahâxa pațâlika. (19) Maha pradhanartha lekhi. (20) Maha sándhi-vigrahika. (21) Maha pratihára. (22) Dushta sadhya charâ dhyaxa. (23) Bhânda garika. (24) *Sama Veda*. (25) Each *Gotra* has its tutelary or Patriarchal *Rishi*. The *Pravaras* are the companions of the *Rishi*.

32. Furrowed by the plough, together with seed,—in proportion as he gives culturable land acquired by himself, does he abide in heaven.

33. The giver of land dwells sixty thousand years in heaven. The resumer and the abetter live so many years in hell.

34. They who seize property dedicated to the gods or Brahmins are born black snakes, residing in dry caves, in woods destitute of water.

35. Wrongly taken, or caused to be taken, of the taker or causer, the race until the seventh degree burns.

36. Those of our lineage say—This gift is to be respected. The fortune of men is fickle, like bubbles of water; gift is the fruit of another, and therefore to be preserved.

37. For the benefit of the subject, the wise should regard fixed ordinances. That rascal who by delusion of avarice resumes, suffers a miserable existence.

38. The gifts, which have been here granted by former princes, producing virtue, wealth, and fame, resemble orts and vomited food. What pure man would resume them?

39. He who receives lands, and he who gives, both are virtuous doers, and certainly go to heaven.

40. A conch, a coach, a parasol, lands, a horse, a good elephant, are the indications of land-giving. This is the fruit, Oh PURANDARA.

41. In this race and in another race whoever may be king, of him a suppliant, I beg with clasped hands—Let him not resume this grant.

42. This sovereignty of the earth totters with the stormy blast; the enjoyment of a realm is sweet but for an instant; the breath of man is like a drop of water on the lip of a blade of grass;—virtue is the greatest friend in the journey to the other world.

43. Born in my race or in the race of other kings, those stern monarchs of futurity who may preserve the lands of gods and priests, in honor of them do I place my clasped hands to my forehead.

Prose.

Written by BATSA RAJA, son of SRI DHARMA removing wounds, a stranger, and capable of ten works. The Pundit SRI KESAVA caused to be written, and the smith named LEMA engraved. Be there auspiciousness.

ओं नमो ब्रह्मणे ॥

जयति जलजनाभस्तस्य नाभीसरोजं
जयति जयति तस्माज्जातवानब्जसूतिः ।
अथ जयति स तस्यापत्यमत्रिस्तदक्ष्ण
स्तदनु जयति जन्म प्राप्तवानब्धिबन्धुः ॥१॥

अथ बोधनमादिराजपुत्रं गृहजामातरमब्जबान्धवस्य ।
तनयं जनयाम्बभूव राजा गगनाभोगतडागराजहंसः ॥२॥

पुत्रं पुरूरवसमौरसमाप सूनु
र्ईवस्य सन्नजलराशिरसायनस्य ।
आसीदनन्यसमभाग्यशतोपभोग्या
यस्योर्वशीच सुकलत्रमिहोर्वरा च ॥३॥

अत्रान्वये किल शताधिकसन्निमेध
यूपोपरुद्धयमुनोत्रविविक्तकीर्त्तिः ।
सप्ताब्धिरत्नरसनाभरणाभिराम
(a)
विश्वम्भराशुभरतो भरतो बभूव ॥४॥

हेलागृहीतपुनरुक्तसमस्तशत्रो
गोत्रे जयत्यधिकमस्य स कार्त्तवीर्य्यः ।
अत्रैव हैहयनृपान्वयपूर्वपुंसि
राजेतिनाम शशलक्ष्मणि चाकरोत्सः ॥५॥

स हिमाचल इव कुलचुरिवंशमसूत क्षमाभृतां भर्त्ता ।
मुक्तामणिभिरिवामलवृत्तैः पूतं महीपतिभिः ॥६॥

(a) In original स is erroneously written.

तत्रान्वये नयवतां प्रवरो नरेन्द्रः
पौरन्दरीमिव पुरीं स्वपुरीं पुनानः ।
आसीन्मदान्धनृपगर्वगजाधिराज
निर्माथकेसरियुवा युवराजदेवः ॥७॥

सिंहासने नृपतिसिंहममुष्य सूनु
मारूरुपन्नवनिभर्त्तुरमात्यमुख्याः ।
कोकल्लमर्णवचतुष्टयवीचिसंघ
संघट्टरुद्धचतुरङ्गचमूप्रचारं ॥८॥

इन्दुप्रभां निन्दति हारगुच्छं
जुगुप्सते चन्दनमाक्षिपन्ती ।
यच्च प्रभौ ह्रस्वतरं प्रयाते
वियोगिनीव प्रतिभाति कीर्त्तिः ॥९॥

मरकतमणिपट्टप्रौढवक्षाः स्मितास्यो
नगरपरिघदीर्घ्यं लंघयन् दोर्द्वयेन ।
शिरसि कुलिशपातो वैरिणो वीरलक्ष्मी
पतिरभवदपत्यं यस्य गांगेयदेवः ॥१०॥

प्राप्ते प्रयागवटमूलनिवेशवन्द्यौ
सार्द्धं शतेन गृहिणीभिरमुत्र मुक्तिं ।
पुत्रोऽस्य खड्गदलितारिकरींद्रकुम्भ
मुक्ताफलैः स्म ककुभोऽर्चति कर्णदेवः ॥११॥

अग्र्यं धाम श्रेयसो वेदविद्या
वल्लीकंदः स्वःसवन्त्याः किरीटं ।
ब्रह्मस्तम्बो येन कर्णावतीति
प्रत्यष्ठापि क्ष्मातलब्रह्मलोकः ॥१२॥

(*b*) For the dental *S* miswritten in the plate this is substituted.

अजनि कुलचुरीणां स्वामिना तेन कृष्ण
न्वयजलनिधिलक्ष्म्यां श्रीमदावल्लदेव्यां ।
शशभृदुदयशंकाक्षुब्धदुग्धाब्धिवीची
सहचरितयशःश्रीः श्रीयशःकर्म्मदेवः ॥१३॥

अत्युत्तुङ्गगिरीन्द्रकन्दरसरस्तीरं कथञ्चिद्गते
रीषन्निर्वृतिमङ्गिरागतमिति त्रस्तैर्वदद्भिर्मिथः ।
आकर्ण्य प्रतिशब्दमम्बुनि निजं विम्बं मिलद्भिरिवत्
संवीक्ष्य क्षणमासितं किमपरं यस्यारिभिस्तं तथा ॥१४॥

तस्यात्मजो ऽभूदतुलप्रतापः श्रीमद्गयाकर्ण इति प्रतीतः ।
यस्याहवेष्वद्भुतवैरिकण्ठच्छेदास्रपूर्णेव धरानुरक्ता ॥१५॥

तितांसुना दिक्षु यशोवितानमुन्नत्त्ववेशेन गुणान्वितेन ।
येनारिकान्ता हृदयेषु गाढमारोपितः सज्जति शोकशंकुः॥१६॥

असावर्हणदेव्यां श्रीनरसिंहनरेश्वरं ।
सवेदनमिवेच्छायां प्रथमं सुषुवे सुतं ॥१७॥

उच्चैर्हिरण्यकशिपुप्रतिपादनेन
प्रीतिं परां विबुधसंहतिषु प्रकुर्वन् ।
सौन्दर्य्यमारविनिवारितमारगर्व
श्चित्रं तथाप्ययमहो नरसिंहदेवः ॥१८॥

यो ब्रह्मणां पाणिषु पञ्चषाणि
दानानि धत्ते पयसां पृषन्ति ।
तरव तृष्णामवधूय ते च
रत्नाकरेपि प्रथयन्त्यवज्ञां ॥१९॥

महीभर्त्ता महादानैस्तैस्तुलापुरुषादिभिः ।
मतिमानेकरत्यर्थं कृतार्थयति योऽर्थिनः ॥२०॥

कुर्वन् महीं ब्राह्मणसादरिच्छत्रनिवर्हणः ।
सार्द्धं परशुरामेण यः स्पर्द्धामधिरोहति ॥२१॥

तस्यानुजो नरपतिर्जयसिंहदेवः
शौर्य्योज्ज्वलैरपिनृपैः क्रियमाणसेवः ।
यद्दानलुप्तयशसेव सुरद्रुमेण
व्याप्ता भूतलतलेबलिना प्रलीनं ॥२२॥

राष्ट्रं गूर्जरभूभुजा तु कुवलं मुक्तं तुरुष्केण च (c)
त्यक्तः कुन्तलनायकेन सहसा कंदर्पकेलिक्रमः ।
श्रुत्वा श्रीजयसिंहदेवनृपतेराज्याभिषेकं (d) नृपाः
सन्त्रासादपरे प्यपास्य जगतीं पारं ययुर्वारिधेः ॥२३॥

कथञ्चिद्यद्यशश्चन्द्रचन्द्रिकाधवलीकृते ।
बलक्षा लक्ष्यते व्योम्नि (e) पतन्ती खगसंहतिः ॥२४॥

रमणगुणनिकेतः केतनं मङ्गलानां
प्रचुरतरयशोभिः शोभितस्तत्तनूजः ।
नृपतिरवनिभानुर्विश्वविश्रान्तभानु
र्जयति विजयसिंहः संहतारातिसिंहः ॥२५॥

दृष्टिर्यस्याः सुधावृष्टिः सन्निधिश्चापि सन्निधिः ।
वाणी चिन्तामणिः श्रीमद्जीयाद्वासल्लदेव्यसौ ॥२६॥

स च परमभट्टारकमहीश्वराधिराजपरमेश्वरश्रीवामदेवपादानुध्यातपरमभट्टारकमहाराजाधिराजपरमेश्वर परममाहेश्वर चि
कलिंगाधिपतिनिजभुजोपार्ज्जिताश्वपतिगजपतिनरपतिराजचया

(c) Obscure in the original; supplied by conjecture.

(d) An orthographical error is corrected.

(e) Inserted by conjecture.

धिपति श्रीमद्विजयसिंहदेवपतेर्विजयिनः महाराज्ञीश्रीमहाकुमारः श्रीअजयसिंहदेवः महामंत्रिशैवाचार्य्यभट्टारकश्रीमद्राजगुरुविद्या देवमहापुरोहितपण्डितयज्ञधरधर्म्मप्रधानमहामात्यठक्कुरश्रीकीकी महाक्षपटलिक महाप्रधानार्थलेखिठक्कुर श्रीदशमूलिकवत्सराज महासान्धिवियहिकठक्कुर पुरुषोत्तम महाप्रतीहारदुष्टसाध्यचरा ध्यक्षभाण्डागारिकप्रभक्तवारणाश्वखाधीनका (f) इत्येतानन्यांश्च प्र दास्यमानग्रामनिवासिजनपदांश्चाज्ञययथार्हं मानयति बोधयति समाज्ञापयति च। यथाविदितमस्तुभवतां। संवत् ९३२। श्रीमन्ति पुण्यां युगादौ नर्म्मदायां विधिवत्स्नात्वा श्रीमन्महादेवं समभ्यर्च्य मातापित्रोरात्मनश्च पुण्य यशोतिवृद्धये सम्वलपत्तलायांचोरलयो (g) यामश्चतुःसीमापर्य्यन्तश्चतुराघाटविसर्गः सगोप्रचारः सजलस्थलः साम्रमधूकः सलवणाकरः सगर्त्तोषरः सनिर्गमप्रवेशः सजांगलानूपो वृक्षारामोद्भिदोद्याततृणादिसहितः (h)

अर्द्धपुरुषारिकादायादिसमन्वितः सवनपर्वतः सर्व बाधाविव र्जितः ग्रामोयं सावर्णगोत्राय भार्गव च्यवन आप्नुवान् और्व जाम दग्न्यति पञ्चप्रवराय छन्दोगशाखिने पण्डितश्रीजनार्द्दनप्रपौत्राय पण्डितश्रीसूक्ष्मणपौत्राय पण्डितश्रीक्षितुपुत्राय पण्डितश्रीसीढ शर्म्मणे ब्राह्मणायोदकपूर्वकथनं शासनीकृत्यास्मद्भ्यनुज्ञया मातृ श्रीमद्वासलदेव्या प्रदत्तः।

अत्रचाभ्यर्थनादातुर्भवति यथा॥

सर्व्वानेतान् भाविनः पार्थिवेन्द्रान
भूयोभूयो याचते रामभद्रः।
सामान्योयं धर्म्मसेतुर्नृपाणां
कालेकाले पालनीयो भवद्भिः॥२७॥

(f) Correction. (g) Sic in original. (h) Here a line is obliterated.

वज्रभिर्व्वसुधा भुक्ता राजभिः सगरादिभिः ।
यस्य यस्य यदा भूमिस्तस्य तस्य तदा फलं ॥२८॥

सुवर्णमेकं गामेकां भूमेरप्येकमङ्गुलं ।
हरन्नरकमाप्नोति यावदाभूतसंप्लवं ॥२९॥

तडागानां सहस्रेण अश्वमेधशतेनच ।
गवां कोटिप्रदानेन भूमिहर्त्ता न शुध्यति ॥३०॥

स्वदत्तां परदत्तां वा यो हरेत वसुन्धरां ।
स विष्ठायां कृमिर्भूत्वा पितृभिः सह मज्जति ॥३१॥

कालकृष्टां महीं दद्यात् सबीजां सस्यशालीनीं ।
यावत् स्वयं कृतां लोकस्तावत् स्वर्गे महीयते ॥३२॥

षष्टिवर्षसहस्राणि स्वर्गे वसति भूमिदः
आच्छेत्ता चानुमन्ता च तान्येवनरके वसेत् ॥३३॥

वारिहीनेष्वरण्येषु शुष्ककोटरवासिनः ।
कृष्णसर्पास्तु जायन्ते देवब्रह्मस्वहारिणः ॥३४॥

अन्यायेन हृता भूमिरन्यायेन तु हारिता ।
हरतो हारयतश्च दहत्या सप्तमंकुलं ॥३५॥

अस्मत्कुलक्रमगताः समुदाहरन्ति
अन्यैश्च दानमिदमभ्युपमोदनीयं ।
लक्ष्मीश्चला सलिलबुद्बुदवन्नराणां
(i)
दानं फलं परमतः परिपालनीयं ॥३६॥

(i) In original द्व

प्रजाहितार्थं स्थितयः प्रणीता
धर्म्मेषु विद्वान् परिपालयेत ।
यो लोभमोहाद्वरते दुरात्मा
सोधो व्रजेद्दुर्गतिमाशु कष्टां ॥३७॥

यानीह दत्तानि पुरा नरेन्द्रै
र्दानानि धर्म्मार्थयशस्कराणि ।
निर्म्माल्यवान्तप्रतिमानि तानि
को नाम साधुः पुनरादद्दीत ॥३८॥

भूमिं यः प्रतिगृह्णाति यश्च भूमिं प्रयच्छति ।
उभौ तौ पुण्यकर्म्माणौ नियतं स्वर्गगामिनौ ॥३९॥

शंखो भद्रासनं छत्रं धराश्चावरवारणाः ।
भूमिदानस्य चिह्नानि फलमेतत् पुरन्दर ॥४०॥

अस्मिन् वंशेऽन्यवंशे च यः कश्चिन्नृपतिर्भवेत् ।
तस्याहं हस्तलग्नोस्मि शासनं न व्यतिक्रमेत् ॥४१॥

वाताभ्रविभ्रममिदं वसुधाधिपत्य
मापातमात्र मधुरो विषयोपभोगः ।
प्राणास्तृणाग्रजलविन्दुसमा नराणां
धर्म्मः सखा परमहोपरलोकयाने ॥४२॥

मद्वंशजाः परमहीपतिवंशजा वा
(J)
पाषाणदण्डमनसो भुविचारिभूपाः ।
ये पालयन्त्यमरविप्रभुवः स्वराज्ये
तेषां मया विरचितोऽञ्जलिरेषमूर्द्ध्नि ॥४३॥

(J) Correction hazarded.

अभ्युद्धरणव्रण श्रीधर्म्मसूनुना
लिखितं वत्सराजेन वैदेश दशमूलिना ॥
पण्डित श्रीकेशव लेखितं ।
सूचधारनामलिमोत्कीर्णम् (k) ॥ शुभं भवतु ।
श्रीहरचन्द्रपण्डितेन श्रीरामगोविन्दपण्डितेन च
ताम्रशासनादुद्धृतं ॥

ART. V.—*Mr.* MIDDLETON *on the Meteors of August 10th*, 1839.

To the Editor of the Asiatic Journal.

SIR,—I beg to send you an account of several meteors, commonly called *ærolites*, which appeared at Calcutta on the evening of Saturday the 10th instant, and trust that simultaneous observations in other parts of India, may confer upon it scientific value. It is particularly desirable, that if the same phenomena were witnessed by others, they should publish the particulars, since by numerous and varied observations alone can any hope of ultimate acquaintance with those yet mysterious bodies be entertained.

At 11 P. M. the atmosphere being particularly clear, my attention was attracted by a meteor of comparatively small size, and of a reddish colour, like that of the planet Mars, and unaccompanied by any train. It first appeared at a point in or near the prime vertical, and having about 40° of zenith distance, and it disappeared about 30° above the horizon. This was, about thirty minutes after, followed by another of far greater brilliancy and magnitude, which appeared in nearly the same place and followed the same path, projecting behind it a luminous train, stretching from the place of its appearance to that of the disappearance of the body, and vanishing simultaneously with it. The train while it lasted most distinctly marked the path of the *ærolite*, which appeared to be a curve of small curvature; while the height and direction of the body, as indicated by it, was such as to have carried it far beyond my horizon. The velocity of this meteor, like that of the others, was amazing, carrying it through between 50° and 60° in as near as I could guess, about 1½ second. At five minutes past eleven another appeared in the zenith, and swept along, in apparently a straight line, vanishing at about the same elevation above

(k) In original स

the horizon as the former ones. The magnitude and brilliancy of this body was nearly like that of the planet Venus, as seen at present; its bright train being thickly strewed with sparkling points without progressive motion. Between this time and half-past eleven six others appeared, some to the westward and others to the eastward of the meridian, but much less conspicuous for magnitude and brilliancy than the two last described, and only one of them which appeared about 20° to the west having a train.

The general facts observable regarding them were these,—First, they all appeared at points in or near the prime vertical. Secondly, their common vanishing limit was about 30° above the horizon. Thirdly, their paths appeared to be parallel and lying from north to south. Fourthly, their velocities appeared to be equal.

I may mention, in conclusion, that no sound was observable either on their appearance, progress, or disappearance.

I am, Sir, yours truly,

J. MIDDLETON,
Hindu College.

CALCUTTA,
16*th August*, 1839.

ART. VI.—*Note to the Editors on the Native mode of preparing the perfumed Oils of Jasmine and Bela.* *By* DR. JACKSON, *Ghazeepore.*

In my last communication on the subject of Rose-water, I informed you that the natives here were in the habit of extracting the scent from some of the highly smelling flowers, such as the Jasmine, &c., and that I would procure you a sample, and give you some account of the manner in which it is obtained. By the present Steamer I have dispatched two small phials containing some of the Oil procured from the Jasmine and the Bela flower. For this purpose the natives never make use of distillation, but extract the essence by causing it to be absorbed by some of the purest oleaginous seeds, and then expressing these in a common mill, when the oil given out has all the scent of the flower which has been made use of. The plan adopted, is to place on the ground a layer of the flower, about four inches thick and two feet square; over this they put some of the Tel or Sesamum seed wetted, about two inches thick, and two feet square; on this again is placed another layer of flowers, about four inches thick, as in the first instance; the whole is then covered with a sheet, which is held down by weights at the ends and sides. In this state it is allowed to remain from twelve to eighteen hours; after this the flowers are removed, and other layers placed in the

same way; this also is a third time repeated, if it is desired to have the scent very strong. After the last process, the seeds are taken in their swollen state and placed in a mill; the oil is then expressed, and possesses most fully the scent of the flower.* The oil is kept in prepared skins called *dubbers*, and is sold at so much per seer. The *Jasmine* and *Bela*† are the two flowers from which the natives in this district chiefly produce their scented oil, the *Chumbul*‡ is another; but I have been unable to procure any of this. The season for manufacture is coming on. The present oils were manufactured a year ago, and do not possess the powerful scent of that which has been recently prepared. Distillation is never made use of for this purpose as it is with the roses, the extreme heat, (from its being in the middle of the rains, when the trees come into flower) would most likely carry off all the scent. The Jasmine, or *Chymbele* as it is called, is used very largely amongst the women, the hair of the head, and the body, being daily smeared with some of it. The specimen I send you costs at the rate of two Rupees per seer.

July 10, 1839.

ART. VII.—*Report on the manufacture of Tea, and on the extent and produce of the Tea Plantations in Assam. By* C. A. BRUCE, *Superintendent of Tea Culture.*

(Presented by the Tea Committee, August 16th, 1839.)

I submit this report on our Assam Tea with much diffidence, on account of the troubles in which this frontier has been unfortunately involved. I have had something more than Tea to occupy my mind, and have consequently not been able to commit all my thoughts to paper at one time; this I hope will account for the rambling manner in which I have treated the subject. Such as my report is, I trust it will be found acceptable, as throwing some new light on a subject of no little importance to British India, and the British public generally. In drawing out this report, it gives me much pleasure to say, that our information and knowledge respecting Tea and Tea tracts are far more extensive than when I last wrote on this subject;—the number of tracts now known amounting to 120, some of them very extensive, both on the hills and in the plains. A reference to the accompanying map will

* A closely similar plan is followed in Europe in the preparation of the Jasmine, and several other very fugitive perfumes The fixed oil employed is usually that of the *Ben* or Moringa nut, with which cotton is soaked. The cotton and flowers are then placed in alternate layers, as in the Indian process.—EDS.

† *Jasminum zambac.*

‡ *Jasminum grandiflorum.*

shew that a sufficiency of seeds and seedlings might be collected from these tracts in the course of a few years to plant off the whole of Assam; and I feel convinced, from my different journeys over the country, that but a very small portion of the localities are as yet known.

Last year in going over one of the hills behind *Jaipore*, about 300 feet high, I came upon a Tea tract, which must have been two or three miles in length, in fact I did not see the end of it; the trees were in most parts as thick as they could grow, and the Tea seeds (smaller than what I had seen before) fine and fresh, literally covered the ground; this was in the middle of November, and the trees had abundance of fruit and flower on them. One of the largest trees I found to be two cubits in circumference, and full forty cubits in height. At the foot of the hill I found another tract, and had time permitted me to explore those parts, there is no doubt but I should have found many of the Naga Hills covered with Tea. I have since been informed of two more tracts near this. In going along the foot of the Hills to the westward, I was informed that there was Tea at *Teweack*, or near it: this information came too late, for I had passed it just a little to the east of the Dacca river, at a place called *Cheriedoo*, a small hill projecting out more than the rest on the plain to the northward, with the ruins of a brick temple on it; here I found Tea, and no doubt if there had been time to examine, I should have found many more tracts. I crossed the Dacca river at the old fort of *Ghergong*, and walked towards the Hills, and almost immediately came upon Tea. The place is called *Hauthoweah*. Here I remained a couple of days, going about the country, and came upon no fewer than thirteen tracts. A Dewaniah who assisted me to hunt out these tracts, and who was well acquainted with the leaf, as he had been in the habit of drinking tea during his residence with the Singphoes, informed me that he had seen a large tract of Tea plants on the Naga mountains, a day's journey west of *Chiridoo*. I have no reason to doubt the veracity of this man; he offered to point out the place to me, or any of my men, if they would accompany him; but as the country belonged to Raja Poorunda Sing, I could not examine it. I feel convinced the whole of the country is full of Tea.

Again, in going further to the south-west, just before I came to *Gabrew* hill, I found the small hills adjoining it, to the eastward, covered with Tea plants. The flowers of the Tea on these hills are of a pleasant delicate fragrance, unlike the smell of our other Tea-plants; but the leaves and fruit appear the same. This would be a delightful place for the manufacture of Tea, as the country is well populated, has abundance of grain, and labour is cheap. There is a small stream called the

Jhangy river, at a distance of two hours walk; it is navigable, I am informed, all the year round for small canoes, which could carry down the Tea; and the place is only one and a half day's journey from *Jorehaut*, the capital of Upper Assam. South-west of *Gabrew Purbut* (about two days journey) there is a village at the foot of the hill, inhabited by a race called Norahs; they are Shans, I believe, as they came from the eastward, where Tea abounds. I had long conversations with them, and the oldest man of the village, who was also the head of it, informed me, that when his father was a young man, he had emigrated with many others, and settled at *Tipum*, opposite *Jaipore*, on account of the constant disturbances at *Munkum*; that they brought the Tea plant with them and planted it on the *Tipum* hill, where it exists to this day; and that when he was about sixteen years of age, he was obliged to leave *Tipum*, on account of the wars and disturbances at that place, and take shelter at the village where he now resides. This man said he was now eighty years of age, and that his father died a very old man. How true this story is, I cannot say, and do not see what good it would do the old man to fabricate it. This was the only man I met with in my journeys about the country who could give any account of the Tea plant, with the exception of an Ahum, who declared to me that it was Sooka, or the first Kacharry Rajah of Assam, who brought the Tea plant from *Munkum*; he said it was written in his *Putty*, or history. The *Ahum-Putty* I have never been able to get hold of; but this I know, that the information about the Tea plant pointed out by the old Norah man, as being on the *Tipum* hill, is true; for I have cleared the tract where it grew thickest, about 300 yards by 300, running from the foot of the hill to the top. The old man told me his father cut the plant down every third year, that he might get the young leaves.

To the west of *Gabrew* I did not find any Tea; but to the westward of the *Dhunseeree* river I found a species, though not the same as that we use. If the people on the west side of the *Dhunseeree* river were acquainted with the true leaf, I think Tea would be found. I planted it all along the route I went, which may lead to its eventual discovery; but people should be sent to search for the plant who are really acquainted with it. I think a vast quantity of Tea would be brought to light if this were done. A reference to the map will shew how our tracts are distributed all over the country. How much Tea they would all produce if fully worked, I will not pretend to say; but in the course of this subject, I will mention such matters relative to the tracts and the plants on them, that every one may make his own calculation. Until lately we had only two Chinese Black-Tea makers. These men have

twelve native assistants; each Chinaman with six assistants can only superintend one locality, and the Tea leaves from the various other tracts, widely separated, must be brought to these two places for manufacture. The consequence is, that an additional number of labourers must always be employed to bring the leaves from so great a distance. The leaves suffer when brought in large quantities from a distance, as they soon begin to ferment, and the labour of only preparing them so far in process that they may not spoil by the morning, is excessive. The men have often to work until very late to accomplish this. When labour falls so very heavy, and on so very few, it cannot be expected that it can be equally well executed, as if more had been employed. The leaves last gathered are also much larger than they ought to be, for want of being collected and manufactured earlier; consequently the Tea is inferior in quality. I mention this, to shew the inconvenience and expense of having so few Tea makers.

The samples of Black-Tea made by the twelve assistants having been approved of by the Tea Committee in Calcutta, it was my intention to have distributed the men amongst the different tracts, but the late disturbances on our frontier have prevented this arrangement; and I have been obliged to employ ten men in Assam (two others having gone to Calcutta in charge of Tea) at the tract called *Kahung*, which is becoming a very extensive and important Tea locality—so many others being near it, which can all be thrown into one. When we have a sufficient number of manufacturers, so that we can afford to have some at each tract, or garden, as they have in China, then we may hope to compete with that nation in cheapness of produce; nay, we might, and ought, to undersell them; for if each tract, or garden, had its own Tea maker and labourers, the collecting of the leaves would not perhaps occupy more than twelve days in each crop; after which the men might be discharged, or profitably employed on the Tea grounds. But now, for the want of a sufficient number of labourers and Tea makers, there is a constant gathering of leaves throughout the month; and as I said before, those gathered last can only make inferior Teas; besides the great loss by the leaves getting too old, and hereby unfit for being made into any Tea; and all this entirely for want of hands to pluck the leaves. It is true we have gained twelve Black-Tea makers this year, in addition to the last; and twelve more native assistants have been appointed, who may be available next year to manufacture Tea independently, as they were learning the art all last year. We have also had an addition to our establishment of two Chinese Green-Tea manufacturers, and twelve native assistants have been placed under them as learners; but what are these compared

to the vast quantity of Tea, or the ground the Tea plants cover, or might be made to cover in three years, but a drop of water in the ocean? We must go on at a much faster pace in the two great essentials—Tea manufacturers, and labourers,—in order to have them available at each garden, when the leaves come into season.

If I were asked, when will this Tea experiment be in a sufficient state of forwardness, so as to be transferable to speculators? I would answer, when a sufficient number of native Tea manufacturers have been taught to prepare both the Black and the Green sort; and that under one hundred available Tea manufacturers, it would not be worth while for private speculators to take up the scheme on a large scale; on a small one it would be a different thing. In the course of two or three years we ought to have that number. Labourers must be introduced, in the first instance, to give a tone to the Assam Opium-eaters; but the great fear is, that these latter would corrupt the new comers. If the cultivation of Tea were encouraged, and the Poppy put a stop to in Assam, the Assamese would make a splendid set of Tea manufacturers and Tea cultivators.

In giving a statement of the number of Tea tracts, when I say that *Tingri*, or any other tract is so long and so broad, it must be understood, that space to that extent only has been cleared, being found to contain all the plants which grew thickly together; as it was not thought worth while at the commencement of these experiments to go to the expense of clearing any more of the forest for the sake of a few straggling plants. If these straggling plants were followed up, they would in all probability be found gradually becoming more numerous, until you found yourself in another tract as thick and as numerous as the one you left; and if the straggling plants of this new tract were traced, they would by degrees disappear until not one was to be seen. But if you only proceeded on through the jungles, it is ten to one that you would come upon a solitary Tea plant, a little further on you would meet with another; until you gradually found yourself in another new tract, as full of plants as the one you had left, growing absolutely so thick as to impede each others growth. Thus I am convinced one might go on for miles from one tract into another. All my Tea tracts about *Tingri* and *Kahung* are formed in this manner, with only a patch of jungle between them, which is not greater than what could be conveniently filled up by thinning those parts that have too many plants. At *Kahung* I have lately knocked three tracts into one, and I shall most probably have to continue doing the same until one tract shall be made of what now consists of a dozen. I have never seen the end of *Juggundoo's* Tea tract,

nor yet *Kujudoo's* or *Ningrew's*. I feel confident that the two former run over the hills and join, or nearly join, some of our tracts in the *Muttuck* country. Nor have I seen the end of *Kahung* tract, all about that part of the country being one vast succession of Tea from *Rungagurra* on the *Debrew*, to *Jaipore* on the *Buri Dehing*. It may be seen on inspecting the map how thickly the Tea localities are scattered—those that are known; and they are but a small portion compared to those that are unknown. There is the *Namsong* tract on the *Naga* hills, the largest that has yet been seen, and the extent of which is not ascertained. The tracts on the *Gubind* hills are unknown; and this is likewise the case with *Haut Holah* and *Cheridoo*; so that there is a large field for improvement throughout, to say nothing of the *Singho* tracts, which may be found to be one unbounded link to *Hookum*; and who knows but it crosses the Irrawaddy to China? Many Tea tracts I know have been cut down in ignorance by the natives, to make room for the rice field, for firewood, and fences, but many of these tracts have sprung up again, more vigorous than before. Witness that at *Ningrew*, where the natives say that every thing was cut down, and the land planted with rice, except on the high ground.

With respect to the Tea plant being most productive on high or low ground, I cannot well say, as all our tracts are on the plains; but from what little I have seen of the hill tracts, I should suppose they were not more productive. In China the hill tracts produce the *best* Teas, and they may do the same here. Almost all my tracts on the plains are nearly on the same level, I should think. *Nudwa* perhaps is a little higher than *Tingri*, and *Tingri* a little higher than *Kahung*, but I believe they are equally productive; although if I leaned towards any side, with my limited experience, I should say that the low land, such as at *Kahung*, which is not so low as ever to be inundated by the strongest rise in the river, is the best. The plants seem to love and court moisture, not from stagnant pools, but running streams. The *Kahung* tracts have the water in and around them; they are all in heavy tree-jungles, which makes it very expensive to clear them. An extent of 300 by 300 will cost from 200 to 300 rupees; i. e. according to the manner in which the miserable Opium-smoking Assamese work. This alone ought to point out the utility of introducing a superior race of labourers, who would not only work themselves, but encourage their women and children to do the same;—in plucking and sorting leaves they might be profitably turned to account for both parties. This I have not been able to instil into the heads of the Assamese, who will not permit their women to come into the Tea gardens. Indeed unless more labourers can be furnished, a larger amount

of Tea must not be looked for at present. Last season it was with the greatest difficulty that I could get a sufficient number of hands to gather the leaves. The plucking of the leaves may appear to many a very easy and light employment, but there are not a few of our coolies who would much rather be employed on any other job; the standing in one position so many hours occasions swellings in the legs, as our plants are not like those of China, only three feet high, but double that size, so that one must stand upright to gather the leaves. The Chinese pluck theirs squatting down. We lie under a great disadvantage in not having regular men to pluck the leaves; those that have been taught to do so, can pluck twice as many as those that have not, and we can seldom get hold of the same men two seasons running. I am of opinion that our trees will become of a smaller and more convenient size after a few years cultivation; because, trimming of the plants, and taking all the young leaves almost as soon as they appear, month after month and year after year, and the plants being deprived of the rich soil they had been living on from time unknown, must soon tell upon them. Transplanting also helps to stunt and shorten the growth of these plants. The Chinese declared to me, that the China plants now at *Deenjoy* would never have attained to half the perfection they now have, under ten years in their own country.

I may here observe, that the sun has a material effect on the leaves; for as soon as the trees that shade the plants are removed, the leaf, from a fine deep green, begins to turn into a yellowish colour, which it retains for some months, and then again gradually changes to a healthy green, but now becomes thicker, and the plant throws out far more numerous leaves than when in the shade. The more the leaves are plucked, the greater number of them are produced; if the leaves of the first crop were not gathered, you might look in vain for the leaves of the second crop. The Tea made from the leaves in the shade is not near so good as that from leaves exposed to the sun; the leaves of plants in the sun are much earlier in season than of those in the shade; the leaves from the shady tract give out a more watery liquid when rolled, and those from the sunny a more glutinous substance. When the leaves of either are rolled on a sunny day, they emit less of this liquid than on a rainy day. This juice decreases as the season advances. The plants in the sun have flowers and fruit much earlier than those in the shade, and are far more numerous; they have flowers and seeds in July, and fruit in November. Numerous plants are to be seen that by some accident, either cold or rain, have lost all their flowers, and commence throwing out fresh

flower-buds more abundantly than ever. Thus it is not unfrequent to see some plants in flower so late as March (some of the China plants were in flower in April) bearing at once the old and the new seeds, flower-buds, and full-blown flowers—all at one and the same time. The rain also greatly affects the leaves; for some sorts of Tea cannot be made on a rainy day; for instance the *Pouchong* and *Mingehew*. The leaves for these ought to be collected about 10 A. M. on a sunny morning, when the dew has evaporated. The *Pouchong* can only be manufactured from the leaves of the first crop; but the *Mingehew*, although it requires the same care in making as the other, can yet be made from any crop, provided it is made on a sunny morning. The Chinese dislike gathering leaves on a rainy day for any description of Tea, and never will do so, unless necessity requires it. Some pretend to distinguish the Teas made on a rainy and on a sunny day, much in the same manner as they can distinguish the shady from the sunny Teas—by their inferiority. If the large leaves for the Black-Tea were collected on a rainy day, about seven seers, or fourteen pounds, of green leaves would be required to make one seer, or two pounds, of Tea; but if collected on a sunny day, about four seers, or eight pounds, of green leaves, would make one seer, or two pounds, of Tea;—so the Chinamen say. I tried the experiment, and found it to be correct. Our season for Tea making generally commences about the middle of March; the second crop in the middle of May; the third crop about the first of July; but the time varies according to the rains setting in sooner or later. As the manufacture of the *Sychee* and the *Mingehew* Black-Teas has never been described, I will here attempt to give some idea how it is performed.

Sychee Black-Tea. The leaves of this are the *Souchong* and *Pouchong*. After they have been gathered and dried in the sun in the usual way (see my former account of Black-Tea) they are beaten and put away four different times; they are then put into baskets, pressed down, and a cloth put over them. When the leaves become of a brownish colour by the heat, they throw out and have a peculiar smell, and are then ready for the pan, the bottom of which is made red hot. This pan is fixed in masonry breast high, and in a sloping position, forming an angle of forty degrees. Thus the pan being placed on an inclined plane, the leaves, when tossed about in it cannot escape behind, or on the sides, as it is built high up, but fall out near the edge close to the manufacturer, and always into his hands, so as to be swept out easily. When the bottom of this pan has been made red hot by a wood fire, the operator puts a cloth to his mouth to prevent inhaling any of the hot vapour. A man on the left of him stands ready with a basket

of prepared leaves; one or two men stand on his right with dollahs, or shallow baskets, to receive the leaves from the pan, and another keeps lifting the hot leaves thrown out of the pan into the dollah, that they may quickly cool. At a given signal from the Chinaman, the person with the basket of prepared leaves seizes a handful and dashes it as quick as thought, into the red hot pan. The Chinaman tosses and turns the crackling leaves in the pan for half a minute, then draws them all out by seizing a few leaves in each hand, using them by way of a brush, not one being left behind. They are all caught by the man with the dollah or basket, who with his disengaged hand continues lifting the leaves, and letting them fall again, that they may quickly cool. Should a leaf be left behind in the pan by any accident, the cloth that is held ready in the mouth is applied to brush it out; but all this is done as quick as lightning. The man that holds the basket of leaves watches the process sharply; for no sooner is the last leaf out of the pan, than he dashes in another handful, so that to an observer at a little distance, it appears as if one man was dashing the leaves in, and the other as fast dashing them out again—so quickly and dexterously is this managed. As soon as one basket has received about four handsful of the hot leaves from the pan, it is removed, and another basket placed to receive the leaves; and so on, until all is finished. A roaring wood fire is kept up under the pan to keep the bottom red hot, as the succession of fresh leaves tends greatly to cool the pan, which ought always to be scrubbed and washed out after the process is over. In China these pans are made of cast iron, and if great care is not taken they will crack in the cooling; to prevent which, one man keeps tapping the inside of the edge of the pan briskly with a wet broom, used in the cleaning of the vessel, while another pours cold water in gently; thus it cools in a few seconds, and is ready for another batch of Tea. The leaves are rolled and tatched the same as the other Teas, and put into the drying basket for about ten minutes. When a little dry, people are employed to work and press the leaves in the hands in small quantities, of about one and a half to two rupees weight at a time, for about half a minute; they are then put into small square pieces of paper and rolled up; after this they are put into the drying basket, and permitted to dry slowly over a gentle fire for some hours, until the whole is thoroughly dry. This Tea is not sold in the China market, it is used principally as offerings to the priests, or kept for high days and holidays. It is said to be a very fine Tea, and there is not one man in a hundred who can make it properly. The *Pouchong* Tea is made in the same way as the *Sychee*, with this exception, that it is not formed into balls.

Mingchew Black-Tea. The leaves *(Pouchong)* are plucked and dried in the sun, and are then beaten and dried in the shade for half an hour; this is done three successive times, and the leaves are very much shaken by a circular motion given to them in a sieve, so as to keep them rolling and tumbling about in the centre of it. This treatment continues until they are very soft; they are then allowed to remain for a short time; the contents of the first sieve are then placed in the centre of a close worked bamboo basket with a narrow edge, and the leaves are divided into four equal parts. The contents of the second sieve are placed in another bamboo basket like the former, and this basket is placed on the top of the first, and so on, piling one basket upon another until all is finished;—there may be about two pounds of leaves in each basket. The red hot pan is used the same as in *Sychee*, only now the men cast in one division of the leaves into the basket, and this is tumbled and tossed about in the red hot pan, like a plaything, for about thirty seconds, and then swept out; another division is cast in, and so on, until all the prepared baskets have been emptied. The contents of each basket are still kept separate, by placing the leaves when they come out of the pan in separate baskets. The whole is a brisk and a lively scene, and quite methodical, every one knowing his station, and the part he has to perform. The baskets are then arranged on shelves to air; the contents are afterwards tatched the same as our Black-Teas, and fired in the drying baskets, but with this difference, that each division is placed on paper and dried. When it is half dry (the same as our Teas) it is put away for the night, and the next morning it is picked, and put into the drying baskets over gentle deadened fires, and gradually dried there; it is then packed hot. This Tea is a difficult sort to make.

Shung Paho Black-Tea. Pluck the young *(Paho)* leaf that has not yet blown or expanded, and has the down on it; and the next one that has blown with a part of the stalk; put it into the sun for half an hour, then into the shade; tatch over a gentle fire, and in tatching roll the leaves occasionally in the pan, and spread them all round the sides of the same; again roll them until they begin to have a withered and soft appearance; then spread them on large sieves, and put them in the shade to air for the night; next morning pick, and then fire them well. Some Tea makers do not keep them all night, but manufacture and pack the Tea the same day. This Tea is valued in China, as it is very scarce; but the Chinamen acknowledge that it is not a good sort: They prefer the Teas, the leaves of which have come to maturity.

The China Black-Tea plants which were brought into *Muttuck* in 1837, amounted in all to 1609—healthy and sickly. A few of the lat-

ter died, but the remainder are healthy, and flourish as well, as if they had been reared in China. The leaves of these plants were plucked in the beginning of March, and weighed sixteen seers, or thirty-two pounds. Many of the plants were then in flower, and had small seeds. They are about three feet high, and were loaded with fruit last year, but the greater part of it decayed when it had come to maturity, as was the case with the Assam Tea-seeds, and almost every seed of these wilds, in the past year. The seeds should, I think, be plucked from the plant when thought ripe, and not be permitted to drop or fall to the ground. I collected about twenty-four pounds of the China seeds, and sowed some on the little hill of *Tipum* in my Tea garden, and some in the Nursery-ground at *Jaipore;* above three thousand of which have come up, are looking beautiful, and doing very well. I have since found out that all the China seedlings on *Tipum* hill have been destroyed by some insect.

The Assam and China seedlings are near each other; the latter have a much darker appearance. I have made but few nurseries, or raised plants from seed, as abundance of young plants can be procured, of any age or size, from our Tea tracts. There may be about 6,000 young seedlings at *Chubwa;* at *Deenjoy* about 2,000; at *Tingri* a few; and some at *Paundooah.* In June and July, 1837, 17,000 young plants were brought from *Muttuck,* and planted at a place called *Toongroong Patar,* amongst the thick tree jungles of *Sadiya.*

In March of the same year six or eight thousand were brought from *Muttuck,* and planted in different thick jungles at *Sadiya;* many of these died in consequence of the buffaloes constantly breaking in amongst them; the rest are doing well, but I am afraid will be killed from the above cause; and now that I have removed to *Jaipore,* they are too far off for my personal superintendence.

In 1838, 52,000 young Tea plants were brought from the *Nemsong Naga* hill tracts, about ten miles from *Jaipore;* a great portion of these have been lately sent to Calcutta, to be forwarded to Madras; should they thrive there, it is my opinion that they will never attain any height, at least not like ours, but be dwarfish like the China plants. *Deenjoy, Chubwa, Tingri,* and *Geela-Jhan* tracts have been filled up or enlarged with plants from the jungle tracts. In transplanting from one sunny tract to another, when done in the rains, very few, if any, die; if the plants be removed from a deep shade to a sunny tract, the risk is greater, but still, if there is plenty of rain, few only will die. If from a deep shade to a piece of ground not a Tea tract, and exposed to the sun—for instance from the *Naga* hills to *Jaipore*—if there be plenty of rain, and the soil congenial, as it is at this place,

few will die; if shaded by a few trees, less will perish; if taken from shade, and planted in shade and the soil uncongenial, but there is plenty of rain, the greater portion will live;—witness *Toongroong Patar* at *Sadiya*. If the plants are brought from deep shade, and planted in the sun in uncongenial soil, let them have ever so much rain, not one in fifty will be alive the third year;—witness 30,000 brought to *Sadiya*. I believe the Tea plant to be so hardy that it would almost live in any soil, provided it were planted in deep shade when taken to it. There should be plenty of water near the roots, but the plant should always be above inundation. As soon as it has taken root, which it will soon do, the shade may be removed, and there will be no fear of the plant dying.

The advantage of getting plants from the jungle tracts is, that you can get them of any age or size; nothing more is necessary than to send a few coolies early in March, just as the rains commence, and have the plants of the size required removed to your own garden; and if they are of a moderate size, you may gather a small crop of Tea from them the next year. As these plants are very slender, it would be best to plant four or five close together to form a fine bush. If the plants are raised from seed, you may expect a small crop of Tea the third year, but they do not come to maturity under six years. It is said they live to the age of forty or fifty years. The Chinese way of digging a hole, and putting in a handful or two of seed, does not succeed so well in this country, as putting two or three seeds on small ridges of earth and covering them over, which I have found to answer better.

In clearing a new Tea tract, if the jungle trees are very large and numerous, it would be as well to make a clean sweep of the whole, by cutting them and the Tea plants all down together; for it would be impossible to get rid of so much wood without the help of fire. The Tea plants, if allowed to remain, would be of little use after they had been crushed and broken by the fall of the large trees, and dried up by the fire; but admitting that they could escape all this, the leaves of trees from twelve to twenty feet high could not be reached, and if they could, they would be almost useless for Tea manufacture, as it is the young leaves, from young trees, that produce the best Teas. But if all were cut down and set fire to, we should have a fine clear tract at once, at the least expense, and might expect to have a pretty good crop of Tea one year after the cutting, or, at furthest, the second year; for it is astonishing with what vigour the plant shoots up after the fire has been applied. And we gain by this process; for, from every old stock or stump cut down, ten to twelve more vigorous shoots

spring up, so that in the place of a single plant you have now a fine Tea bush. I think from what I have seen of these plants, that if cut down every third year, they would yield far superior Teas; neither am I singular in this opinion; the Green-Tea Chinamen having told me that they cut down their plants every ninth year, which may be reckoned equivalent to our third year, taking into consideration the size of our trees and the richness of our soil. Our trees, or plants, are certainly more than four or five times the size of theirs, and must consequently yield so many times more produce; theirs is the dwarf, ours the giant Tea. The size of the leaf matters nothing, in my opinion, provided it is young and tender; even their diminutive leaf, if one day too old, is good for nothing.

As the Green-Tea Chinamen have just commenced operations, I will try to give some account of this most interesting process. All leaves up to the size of the *Souchong* are taken for the Green-Tea. About three pounds of the fresh leaves, immediately they are brought in, are cast into a hot pan (sometimes they are kept over night when abundance have been brought in, and we have not been able to work all up); they are then rolled and tossed about in the pan until they become too hot for the hand. Two slips of bamboo, each about a foot long, split at one end so as to form six prongs, are now used to tumble and toss the leaves about, by running the sticks down the sides of the pan, and turning the leaves up first with the right hand, then with the left, and this as fast as possible; which keeps the leaves rolling about in the pan without being burnt: this lasts about three minutes; the leaves will then admit of being rolled and pressed without breaking. They are now taken from the pan and rolled in dollahs, much the same as the Black-Tea, for about three minutes, in which process a great quantity of the juice is extracted, if they be fresh leaves; but if they have been kept over night, very little juice can be expressed from them in the morning, on account of its having evaporated. The Chinamen say, this does not matter, as it makes no difference in the Tea. The leaves are then pressed hard between both hands, and turned round and pressed again and again, until they have taken the shape of a small pyramid. They are now placed in bamboo-baskets or dollahs with a narrow edge, and the dollahs on bamboo framework (see fig. 2 of my former account of Black-Tea) where they are exposed to the sun for two or three minutes, after which these pyramids of Tea are gently opened and thinly spread on the dollahs to dry. When the Tea has become a little dry, (which will be the case in from five to ten minutes if the sun be hot) it is again rolled, and then placed in the sun as before; this is done three successive times. But should the

weather be rainy, and there is no hope of its clearing, all this drying is done over the fire in a small drying basket, the same as with Black-Tea. The Green-Tea makers have as great an aversion to drying their Tea over the fire, as the Black-Tea makers. The third time it has been rolled and dried, there is very little moisture left in the Tea; it is now put into a hot pan, and gently turned over and over, and opened out occasionally, until all has become well heated; it is then tossed out into a basket, and while hot put into a very strong bag, previously prepared for it, about four feet long, and four spans in circumference. Into this bag the Tea is pressed with great force with the hands and feet; from fourteen to twenty pounds being put in at one time, and forced into as small a compass as possible. With his left hand the man firmly closes the mouth of the bag immediately above the leaves, while with the right hand he pommels and beats the bag, every now and then giving it a turn; thus he beats and turns and works at it, tightening it by every turn with one hand, and holding on with the other, until he has squeezed the leaves into as small a compass as possible at the end of the bag. He now makes it fast by turns of the cloth where he held on, so that it may not open; and then draws the cloth of the bag over the ball of leaves, thus doubling the bag, the mouth of which is twisted and made fast. The man then stands up, holding on by a post or some such thing, and works this ball of leaves under his feet, at the same time alternately pressing with all his weight, first with one foot and then the other, turning the ball over and over, and occasionally opening the bag to tighten it more firmly. When he has made it almost as hard as a stone, he secures the mouth well and puts the bag away for that day. Next morning it is opened out and the leaves gently separated and placed on dollahs, then fired and dried until they are crisp, the same as the Black-Tea, after which they are packed in boxes or baskets. In China the baskets are made of double bamboo, with leaves between. The Tea may then remain on the spot for two or three months, or be sent to any other place to receive the final process. This first part of the Green-Tea process is so simple, that the natives of this country readily pick it up in a month or two.

The second process now commences by opening the boxes or baskets, and exposing the Tea on large shallow bamboo baskets or dollahs (see former account, fig. 1) until it has become soft enough to roll; it is then put into cast iron pans, set in brick fire-places, the same as described in making the *Sychee* Black-Tea. The pan is made very hot by a wood-fire, and seven pounds of the leaves are thrown into it and rubbed against the pan, with the right hand until tired, and then with the left, so as not to make the process fatiguing. The pan being placed on

an inclined plane the leaves always come tumbling back towards and near the operator, as he pushes them up from him, moving his hand backwards and forwards and pressing on the leaves with some force with the palms, keeping the ends of the fingers up, to prevent their coming in contact with the hot pan. After one hour's good rubbing the leaves are taken out and thrown into a large coarse bamboo-sieve, from this into a finer one, and again a still finer one, until three sorts of Tea have been separated. The first, or largest sort, is put into the funnel of the winnowing machine, which has three divisions of small traps below, to let the Tea out. A man turns the wheel with his right hand, and with the left regulates the quantity of Tea that shall fall through the wooden funnel above, by a wooden slide at the bottom of it. The Tea being thrown from the sieves into the funnel, the man turns the crank of the wheel, and moves the slide of the funnel gradually, so as to let the Tea fall through gently, and in small quantities. The blast from the fan blows the smaller particles of Tea to the end of the machine, where it is intercepted by a circular moveable board placed there. The dust and smaller particles are blown against this board, and fall out at an opening at the bottom into a basket placed there to receive it. The next highest Tea is blown nearly to the end of the machine, and falls down through a trough on the side into a basket; this Tea is called *Young Hyson*. The next being a little heavier, is not blown quite so far; it falls through the same trough, which has a division in the middle; this of course is nearer the centre of the machine. A basket is placed beneath to receive the Tea, which is called *Hyson*. The next, which is still heavier, falls very near to the end of the fan, this is called *Gunpowder* Tea; it is in small balls. The heaviest Tea falls still closer to the fan, and is called *Big Gunpowder*; it is twice or three times the size of *Gunpowder* Tea, and composed of several young leaves that adhere firmly together. This sort is afterwards put into a box and cut with a sharp iron instrument, then sifted and put among the *Gunpowder*, which it now resembles. The different sorts of Tea are now put into shallow bamboo baskets, and men, women, and children are employed to pick out the sticks and bad leaves; this is a most tedious process, as the greatest care is taken not to leave the slightest particle of any thing but good Tea. But to assist and quicken this tiresome process beautiful bamboo sieves, very little inferior to our wire ones, and of various sizes, are employed. The different Teas are thrown into sieves of different sizes, from large Gunpowder to Dust Tea; they are shaken and tossed, and thrown from one person to another in

quick succession, making the scene very animating; in this way a great portion of the stalks are got rid of. After the Tea has been well sifted and picked, it is again put into the hot pans and rubbed and rolled as before, for about one hour; it is then put into shallow bamboo baskets, and once more examined, to separate the different Teas that may still remain intermixed, and again put into the hot pan. Now a mixture of sulphate of lime and indigo, very finely pulverized and sifted through fine muslin, in the proportion of three of the former to one of the latter, is added; to a pan of Tea containing about seven pounds, about half a tea-spoonful of this mixture is put and rubbed and rolled along with the Tea in the pan for about one hour, as before described. The Tea is then taken hot from the pan and packed firmly in boxes, both hands and feet being used to press it down. The above mixture is not put to the Tea to improve its flavour, but merely to give it a uniform color and appearance, as without it some of the Tea would be light and some dark. The indigo gives it the colour, and the sulphate of lime fixes it. The Chinese call the former *Youngtin*, the latter *Acco*. Large Gunpowder Tea they call *Tychen*; little Gunpowder *Cheocheu*; Hyson, *Chingcha*; Young Hyson, *Uchin*; Skin-Tea, or old leaves in small bits, *Poocha*; the fine Dust, or Powder-Tea, *Chamoot*.

The leaves of the Green-Tea are not plucked the same as the Black, although the tree or plant is one and the same, which has been proved beyond a shadow of doubt; for I am now plucking leaves for both Green and Black from the same tract and from the same plants; the difference lies in the manufacture, and nothing else. The Green-Tea gatherers are accommodated with a small basket, each having a strap passed round the neck so as to let the basket hang on the breast. With one hand the man holds the branch, and with the other plucks the leaf, one at a time, taking as high as the *Souchong* leaf; a little bit of the lower end of the leaf is left for the young leaf to shoot up close to it; not a bit of stalk must be gathered. This is a very slow and tedious way of gathering. The Black-Tea maker plucks the leaves with great rapidity with both hands, using only the forefinger and thumb, and collects them in the hollow of the hand; when his hand is full he throws the leaves into a basket under the shade of the tree; and so quickly does he ply his hands that the eye of a learner cannot follow them, nor see the proper kind of leaf to be plucked; all that he sees, is the Chinaman's hands going right and left, his hands fast filling, and the leaves disappearing. Our coolies, like the Green-Tea Chinamen, hold the branch with one hand, and deliberately pluck off the

leaf required, then the next, and so on, by which process much time is lost, and a greater number of hands are wanted. Not having a regular set of pluckers is a very great drawback to us; for the men whom we teach this year we see nothing of the next; thus every year we have to instruct fresh men. This difficulty will be removed when we get regular people attached to the Tea plantations; or when the natives of these parts become more fixed and settled in their habitations, and do not move off by whole villages from one place to another, as they have of late years been doing; and when the aversion they have throughout Assam to taking service for payment, has been overcome. They seem to hold this as mean and servile; preferring to cultivate a small patch of ground which barely yields a subsistence. I can perceive, however, that there is a gradual change taking place in the minds of the labouring class of people, or coolies; for occasionally some good able-bodied men come forward for employment. The generality of those that have hitherto offered themselves, has been from the very poorest and the most worthless in the country. In the cold season, when the men have nothing to sow or reap, two or three hundred can be collected; but as soon as the rains set in, all but those that have not bonds, or are not involved in debt, go off to their cultivations, at the very time when our Tea operations commence. As long as things continue in this state, the price of Tea will be high; but if this drawback were removed, there is nothing to prevent our underselling the Chinese, except the experience of a few more years.

But let us return to our Teas, and take a comparative view of the qualities of the Black and Green-Teas, which may nearly be as follows: *Paho* Black-Tea leaf would make Green-Tea, some Gunpowder, and some Young Hyson. *Pouchong*, although classed as a second Black-Tea, on account of the price it fetches in the market, is a third-rate leaf, for it is rather larger than the *Souchong*. Some of it would make Young Hyson, and some Skin-Tea. *Souchong* would make Hyson and Young Hyson. *Toychong* would make Skin-Tea.—I will here mention the different kinds of Black-Teas, to make the matter more clear to those who take an interest in the subject. *Thowung-Paho* (the *Sung fa* is the same leaf as this) is the downy little leaf not expanded, and the one next to it that has just unfolded a little. This Tea when made appears full of small white leaves, which are the little downy leaves just mentioned. *Twazee-Paho* is from the second crop, and nearly the same kind of Tea, only a little older; the leaf next the small downy one (being a little more expanded) and the small leaf below this, are taken, making three in all; this has also numerous white leaves, but not so many as the former.

Souchong is the next largest leaf; this is well grown, but embraces all the leaves above it. When the upper leaves have grown out of season for *Thowung-Paho* and *Twazee-Paho*, they are all plucked for the *Souchong* from the third and fourth of the upper leaves. From *Souchong* leaves, the *Minchong* and *Sychee* Teas are made in the first crop, and no other. *Pouchong* is the next largest leaf; it is a little older and larger than the *Souchong*. From this leaf the *Sychee* and *Minchong* Teas can be made in the first crop only. The *Pouchong* is never made in the second crop, on account of its not having a good flavour: many of the *Souchong* leaves are mixed up in this Tea. The *Toychong* leaves are those that are rejected from the *Souchong* and *Pouchong*, as being too large and not taking the roll. When the Teas are picked, these leaves are put on one side. The Chinese often put them into a bag, and give them a twist, something in the Green-Tea way, and then mix them up with the *Souchong* to add to the weight. This leaf (*Toychong*) becomes worse in the second and third crops;—it is a cheap Tea and sold to the poor. All the Black-Teas that are damaged have the flower of what the Chinese call *Qui fa*, and another called *Son fa*, mixed up with them. One pound of the flowers is put to each box of damaged Tea. After the Teas have been well tatched and mixed up with other sorts, these leaves give them a pleasant fragrance. The *Son fa* plant is about two feet high, and kept in flower pots; it is propagated from the roots. The *Qui fa* plant is from three to four feet high; one pound of the flowers is put to a box of Tea. This plant was seen in the Botanical Gardens at Calcutta by our Chinese interpreter. The flowers of this plant are considered finer than those of the *Son fa*. I annex a rough drawing of each of them, as given to me by the interpreter; the dots in the drawings are intended for small flowers.*

The Black-Tea makers appear to me to be very arbitrary in their mode of manufacture; sometimes they will take the leaves of the *Thowung-Paho*, or perhaps *Twazee-Paho*; but if it has been raining, or there is any want of coolies to pluck the leaves quickly, or from any other cause, they will let the leaves grow

* These two sketches are not deemed sufficiently instructive to be added here. One of them is entitled *Qui fa*, which is the name of the Olea fragrans, or Sweet-scented Olive, the flowers of which are said to be used for perfuming Teas. But it is more like the Aglaia adorata, a very different plant, which is also supposed to be applied in China for a similar purpose. This last, however, is called *Tsjiulang* by the Chinese, according to Rumpf, and *Sam yeip lan* according to Roxburgh. The other sketch, entitled *Lan fa*, seems to be intended for a liliaceous, or at any rate an endogenous plant. I am unable to offer any conjecture about it.—N. W.

a few days longer, and turn all into *Souchong;* which it must be remembered, takes all the small leaves above it. If it is the first crop, the *Souchong* and *Pouchong* leaves may all be turned into *Souchong* Tea; but even if it is the second crop, when the *Pouchong* leaves ought not to be gathered, they are nevertheless plucked and mixed up with the *Souchong* leaves. Almost all our Black- and all the Green-Teas have just been made from one garden. When the Green-Tea makers complained that the leaves were beginning to get too large for them—that is, they were fast growing out of *Souchong* and running into *Pouchong*—the Black-Tea makers took up the manufacture, plucked all the leaves, and made excellent *Pouchong;* so that between the two, there is not a leaf lost. When the Black-Tea makers have a garden to themselves they are cruel pluckers, for they almost strip the tree of leaves for the *Souchong,* and are not at all nice in the plucking; the third and even the fourth leaf on a tender twig is nipped off in the twinkling of an eye; they then look about for more young leaves, and away go the *Pouchong,* and *Toychong* too, which is the largest leaf of all. But the Green-Tea men pluck quietly, one by one, down to *Souchong.* The Black-Tea men separate all their Teas into first, second, third, and fourth crop; but the Green-Tea manufacturers make no distinction; they prepare all the Tea they can, throughout the season, box or basket it up, and when the season is over, they set off for Canton with their produce; at least all those who do not wish to sell their Tea on the spot. The different merchants go in quest of it there. It now indiscriminately undergoes the second process; that is, the different crops are all mixed up together. No old leaves can be mixed in the Green, as in the Black-Teas; for the long rolling in the pan crushes them, and the fan blows them away, so that only the young leaves are left.

We shall now take a comparative view of the number of men required by the Black and the Green-Tea makers for one pair of pans.

For the Black-Tea makers there will be required,

to tatch, ...	2 men
— roll, ...	4 ,,
— attend to the fire, ...	1 ,,
— dry, ...	1 ,,
— beat and put in the sun, ...	2 ,,
Total number of men	10

To keep these men fully at work, from twenty-five to thirty coolies will be required to pluck leaves, and they will turn out about two

boxes of Tea per day, (weighing one maund, or 80 pounds) if the weather be fine and sunny; but scarcely half that quantity it if be rainy, on account of the coolies not plucking so much on a rainy, as they would on a fair sunny day. As the people of the country become acquainted with the gathering and manufacturing, three boxes, of forty pounds each, may be expected in fine weather, adding perhaps a few men to the number of coolies.

A pair of pans for the Green-Tea makers would require during the first process,

to tatch, ...	2 men
— receive the Tea from the pans, ...	1 ,,
— roll, ...	8 ,,
— attend to the fire, ...	1 ,,
— put the leaves in the sun and turn them, ..	4 ,,
Total number of men, ...	16

Thirty coolies would be required to keep these men in full play, and they would turn out two boxes of twenty-three seers, or forty-six pounds each, per day; in all ninety-two pounds of Tea. If the weather be rainy, of course the produce is much less; as the gatherers then do only half work. Thus the difference between the Black and Green is, that the former requires six manufacturers less; and that when the Black-Tea is finished, boxed, and ready for exportation, the Green has only undergone the first process, and is but half finished; although it is ready for exportation to any appointed place to receive the final and troublesome, as well as most expensive part of the process. Nevertheless the first part of the Green-Tea preparation is easily learnt by the natives of this place in about two or three months. In speaking of the trouble and expense attending the second process of the Green-Tea making, I beg to observe that it appears to me, from what little I have seen of it, that machinery might easily be brought to bear; and as Assam is about to become a great Tea country, it behoves us to look to this. The Tea half made, as above described, I am informed by the Green-Tea Chinamen now with me, is put either into boxes or baskets, with bamboo leaves between; it has to make in this state a long journey by land and water, and then to go one or more months in a boat by sea, before it reaches Canton, where it is laid aside for one or two months more, before it undergoes the second process; making in all about five months from the time it was first prepared. All that is required is to keep it dry. Now if all this be true, which I have no doubt it is, I see no reason why we could not send it to England, and have it made up there. I rather see every thing in favor of such a plan,

and nothing against it. After a year's instruction under Chinamen, it might be left to the ingenuity of Englishmen to roll, sift, and clean the Tea by machinery, and, in fact, reduce the price of the Green-Tea nearly one-half, and thus enable the poor to drink good unadulterated Green-Tea, by throwing the indigo and sulphate of lime overboard. At all events the experiment is worthy of a fair trial, and the first step towards it would be to manufacture the Tea at Calcutta; or perhaps it would be better to let the China Green-Tea makers go direct to England along with it, and have it manufactured there at once.

Now for a word about the Lead-canister maker, who is a very important man in our establishment; for without him, we could not pack our Teas.—On two tiles about an inch thick and sixteen inches square, is pasted, on one side, a sheet of very fine thick paper, said to have been made in Cochin-China, over this another sheet is pasted only at the edges. The paper must be very smooth, and without any kind of hole, knob, or blemish. To make it answer the purpose better, fine chalk is rubbed over it. The tiles thus prepared are laid one over the other and moved backwards and forwards, to ascertain if they work smoothly. The lower tile rests on two pieces of wood, about four inches in thickness, and the exact length of the tile. The room where the sheets of lead are made must be very smooth and level, as the tiles are apt to break when there is any unequal pressure on them. In the corner of the room there is a sunken brick fire-place, the upper part of which rises just a little above the floor; into this fire-place is inserted one of the cast iron pans used for making Tea, and in one corner of the masonry is a vent hole on which in general a Tea-kettle stands. The pan is heated by a wood fire; an iron ladle with a handle, about six or eight inches long, answers the purpose of taking the lead out of the pan when required. The pan may hold about twenty pounds. There is also another ladle with a long handle, and holes at the bottom, to take the dross off. When lead for the sides of the boxes is required, the proportion of one maund of lead to five seers of tin is put into the pan. When well melted and freed from dross, the two tiles above mentioned are placed on the two pieces of wood, one piece being nearly under the centre, and the other at the edge of the lower tile; the upper tile is placed on the lower tile even and square, projecting perhaps a little backward towards the operator. The tiles being thus placed near the melted lead, the Chinaman squats down on them, placing his heels near the edge, with his toes towards the centre; while with his left hand he lays hold of the corner tile, and with the right holds the short ladle, which he dips into the boiler, and takes out

about half a ladleful of the molten metal, tipping up the upper tile with the left hand about three inches, at the same time assisting this operation by pressing on his heels and gently lifting his toes. The upper tile being thus raised he dashes in the contents of the ladle between both, lets go with the left hand, and presses on with his toes, which brings the upper tile with some force to its former position over the lower one, and occasions the superfluous lead to gush out right and left and in front. The upper tile is then raised like the lid of a box, while the lower one rests on the piece of projecting wood underneath, and a fine thin sheet of lead, nearly the size of the tiles, is taken out, and thrown on one side; the upper tile is then gently lowered down, another ladle of hot lead dashed in, and so on in quick succession, about four sheets of lead being made in one minute. The lower tile projecting a little beyond the upper one assists the man to lay the ladle on, and pour in the metal firmly and quickly. To vary the operation, the man sometimes stands up and places one foot on the upper tile, working with his heel and toes, the same as if both feet were on, and just as quickly. Many interruptions take place, such as examining the papers on the tiles, rubbing them with chalk, turning them round, and reversing them. Sometimes half a split bamboo is placed in front and under the tiles, with a piece of paper on it, to receive the lead that falls down, so that it may not come in contact with the ground. This lead is every now and then taken up and put back into the boiler. A maund of lead may make about twelve or thirteen boxes, which will hold forty pounds. There are also two other tiles, about a cubit square; these are used for making the tops of the canisters, which are generally of tin only, but can also be made from the above mixture. It is necessary in making this sheet-lead, to hold the sheets up and examine them; for if not properly prepared, there are sometimes a number of very fine holes in them, which are not perceptible when lying on the ground or table. On this account the first twenty sheets of lead are thrown aside and rejected, even without any examination. When the tiles have become nice and warm, it is then the fine and even sheets, without holes, are obtained. Before a sheet-lead canister can be made, it is necessary to have a model box made to fit into the wooden box, that is to hold the sheet-lead canister; on this box or shell the sheet-lead canister is made. It has a hole at the bottom to prevent any suction in putting it in, or drawing it out of the box or canister; and instead of a top it has a bar of wood across, by which it is drawn out. For soldering, tin, with the eighth or twelfth part of quicksilver, and some rosin are used. The wood part of some of the boxes is covered with paper pasted on and dried in the sun. To give the paper on the boxes a yellow colour, a mixture of paste with

pulverized and sifted saffron is laid on and dried. The paper on the corners of the boxes is ornamented by means of a wooden block with flowers carved on it; on this bit of wood very thin paper, cut to its size, is placed, and a mixture, consisting of pulverized saffron, indigo, and water, having a deep green color, is laid singly on each bit of paper with a brush made of cocoanut fibres. These slips of paper are put one above the other, twenty thick, or as long as the paper takes the impression of the carved wood below. When the corners of the boxes have been ornamented with this paper and dried, another mixture, about the proportion of four seers of oil to three seers of rosin, boiled together, is applied with a cocoanut brush over all the boxes as a finish; after these are dry they are ready for the Tea.

The following table will shew the size and produce of the Tea tracts now worked, and the probable amount of Tea for this and the next season.

Names of Tea tracts fully worked in 1838.	Length and breadth of Tea tracts.	Number of plants in each Tea tract.	Average produce of single Tea plants.	Produce in 1838.	Remarks.
No. 1 Tringri,	267 by 90	5,000	4 Sa. Weight,	260 Seers	
No. 2 Tringri,	155 by 70	2,340	3-12 Sa. Wt.,	160 ,,	
No. 1 Kahung,	480 by 210	1,36,000	4 Sa. Weight,	680 ,,	
No 1 Chubwa,	200 by 160	8,200	4 Sa. Weight,	410 ,,	
Deenjoy,.....	223 by 171	8,400	2 Sa. Weight,	210 ,,	The plants are small in this tract including China plants.
				1,720	
From Shady Tracts, ..	..	..	..	390	
				2,110	
The probable increase of the above Tracts for 1839.				527	
Probable produce of 1839.				2,637 Seers	5,274 lbs.

Names of the tracts to be worked in 1840.	Length and breadth of Tea tracts.	Number of plants in each Tea tract.	Probable produce of one Tea plant.	Probable produce in 1840.	Remarks.
No. 2 Kahung,	192 by 114	4,720	3 Sa. Weight,	177	
No. 3 Do.	215 by 70	3,440	3 Sa. Weight,	129	
No. 2 Chubwa,	160 by 70	2,420	3 Sa. Weight,	90	
Nowholea,	476 by 160	16,480	3 Sa. Weight,	618	
Tipun,	344 by 331	24,620	3 Sa. Weight,	922	The plants in these tracts now small will not yield a good corp for two years.
Jugundoo,	400 by 200	17,300	3 Sa. Weight,	648	
Ningrew,	300 by 189	12,260	3 Sa. Weight,	459	
The probable produce of the above 7 tracts, ...				2,943	
Add the probable produce of the other 5 tracts.				2,637	
Probable produce of all the tracts in 1840.				5,580	11,160 lbs.

It should be borne in mind that this is a rough calculation, and I can only give the probable amount. Most of these plants are very young, or have been recently cut down; a few years hence the plants may yield twice the above quantity. The first table exhibits the absolute produce of 1838. Now let us suppose a new settler were to take land in these parts; what would be his expenses if he were only to cultivate Tea, and had to clear forest land (in the vicinity of the Tea) ten times the size of *Nowholeah*, which is, say 400 by 200 yards, and which would cost him 200 Rupees to clear. Ten such tracts would cover 8,00,000 square yards. Now, to cover this surface of ground with Tea plants, and the plants six feet apart each way, 3,55,555 plants would be required; but if two plants were to be placed together, as I would recommend, then 7,11,110 plants would be required. The cost would probably be at the rate of five annas for 300 plants; thus:

The clearing of 10 tracts, each 400 by 200 yards, ..	2,000	0	0
7,11,110 Tea plants, at 5 annas for 300, ...	740	11	8
Planting the above, ...	474	0	0
Weeding each tract 3 times each year, at 30 Rs. each tract,	900	0	0
5 Tea houses, at 50 Rs. each, ...	250	0	0
200 Hoes at 1 Rupee each, ...	200	0	0
100 Axes at 1 Rupee each, ...	100	0	0
100 Daws at 1 Rupee each, ...	100	0	0
Dollahs, Challonis, &c., bamboo apparatus, ...	200	0	0
8 Saws at 5 Rs. each, ...	40	0	0
Charcoal and firewood for baking the Tea, ...	200	0	0
40 Cast-iron pans, at 4 Rs. each, ...	160	0	0
Paper for Tea boxes, ...	100	0	0
Chalk and Indigo, ...	50	0	0
3 Maunds of Nails of sizes, at 10 Rs. per maund, ..	30	0	0
2 Elephants at 150 Rs. each	300	0	0
2 Elephant mahoots at 6 Rs. each per month, ...	144	0	0
2 Elephant mates at 4 Rs. each per month, ...	96	0	0
Rice for 2 Elephants, ...	96	0	0
Lead for 888 boxes, at 3 seers per box containing 20 seers, at 8 Rs. per maund, ...	532	12	9
A Cooly sirdar at 10 Rs. per month, ...	120	0	0
10 Duffadars, or Overseers of coolies at 3 Rs. per month	360	0	0
Coolies to collect leaves, 30 to each tract, 20 days to each crop; for 3 crops, or 60 days, at 3 Rs. for each man per month, ...	1,800	0	0
Carried over, ..	8,993	8	5

Brought over, . .			8,993	8	5
4 Native carpenters, at 12 Rs. ditto, ...			576	0	0
8 Sawyers, at 4 Rs. ditto, ...			384	0	0
2 Native Lead-canister makers, at 12 Rs. ditto, . .			288	0	0
Coolies to bring in timber for Sawyers, ...			150	0	0
5 Chinamen at 30 Rs. each per month, ...			1,800	0	0
120 Native Tea makers at 5 Rs. each, for 5 months, or one season, ...			3,000	0	0
Freight to Calcutta, ...			400	0	0
Ditto to England, ...			1,000	0	0
Total outlay for 10 tracts, Co's. Rs.			16,591	8	5
Deduct charges that are not annual, viz.—					
Clearing of tracts, ...	2,000	0 0			
Purchase of Tea plants, ...	740	0 0			
Planting ditto, ...	474	0 0			
Building Tea houses, ...	150	0 0			
Purchase of Hoes, ...	200	0 0			
Do. Axes, ...	100	0 0			
Do. Daws, ...	100	0 0			
Do. Saws, ...	40	0 0			
Do. Bamboo apparatus, ...	200	0 0			
Do. Elephants, ...	300	0 0	4,304	0	0
Total annual outlay on 10 tracts,			12,287	8	5
Average produce of 3,55,555 tea plants at 4 Sa. Wt. each plant, is 444 Mds. or 17,777 Srs., or 35,554 lbs. at 2*s.*, or 1 rupee, per pound, would be, ...			35,554	0	0
Annual profit on 10 tracts, Co's. Rs.			23,266	7	7

Annual outlay	Co's. Rs.	*Annual profits*	Co's. Rs.
For 10 tracts, . .	12,287	On 10 tracts, . .	23,266
For 100 tracts, . .	1,22,870	On 100 tracts, . .	2,32,660
For 1000 tracts, . .	12,28,700	On 1000 tracts, . .	23,26,600

N. B.—The deduction of 4304 Rs. not being annual outlay is not included in this calculation above 10 Tracts.

	Tea tract.	Duffadars.	Takelah.	Coolies.
Required for	1	1	10	30
,, for	10	10	100	300
,, for	100	100	1000	3000

It must be remembered that this calculation has been made on 3,55,555 plants, not on double that number as I proposed, viz. to plant them in pairs, which would certainly, on the lowest calculation, increase the profits thirty per cent. It should be borne in mind also, that 4 sicca weight is not the full produce of each plant; when full grown it will yield double that, or 8 sicca weight, and some even as high as 10 to 12 sicca weight. I have calculated at the rate of 4 sicca, which was absolutely produced in 1838. The plant will, I should think, produce 25 per cent more this year, and go on increasing to what I have above mentioned. But then, on the other hand, the items which I have set down, are not all that will be required to carry on this trade on an extensive scale. The superintendence, numerous additional artizans that will be required, and a thousand little wants which cannot be set down now, but which must necessarily arise from the nature of the cultivation and manufacture, will go far to diminish the profits, and swell the outlay; but this of course will last but a few years, until the natives of the country have been taught to compete with Chinamen. It should also be remembered, that the calculation I have made on ten tracts is on a supposition that we have a sufficient number of native Tea-makers and Canister-makers, which will not be the case for two or three years to come. It is on this point alone that we are deficient, for the Tea plants and lands are before us. Yes, there is another very great drawback to the cultivation of Tea in this country, and which I believe I before noticed, namely the want of population and labourers. They will have to be imported and settled on the soil, which will be a heavy tax on the first outlay; but this, too, will rectify itself in a few years; for, after the importation of some thousands, others will come of themselves, and the redundant population of Bengal, will pour into Assam, as soon as the people know that they will get a certain rate of pay, as well as lands, for the support of their families. If this should be the case, the Assamese language will in a few years be extinct.

I might here observe, that the British Government would confer a lasting blessing on the Assamese and the new settlers, if immediate and active measures were taken to put down the cultivation of Opium in Assam, and afterwards to stop its importation, by levying high duties on Opium land. If something of this kind is not done, and done quickly too, the thousands that are about to emigrate from the plains into Assam, will soon be infected with the Opium-mania,—that dreadful *plague*, which has depopulated this beautiful country, turned it into a land of wild beasts, with which it is overrun, and has degenerated the Assamese, from a fine race of people, to the most abject,

servile, crafty, and demoralized race in India. This vile drug has kept, and does now keep, down the population; the women have fewer children compared with those of other countries, and the children seldom live to become old men, but in general die at manhood; very few old men being seen in this unfortunate country, in comparison with others. Few but those who have resided long in this unhappy land know the dreadful and immoral effects, which the use of Opium produces on the native. He will steal, sell his property, his children, the mother of his children, and finally even commit murder for it. Would it not be the highest of blessings, if our humane and enlightened Government would stop these evils by a single dash of the pen, and save Assam, and all those who are about to emigrate into it as Tea cultivators, from the dreadful results attendant on the habitual use of Opium? We should in the end be richly rewarded, by having a fine, healthy race of men growing up for our plantations, to fell our forests, to clear the land from jungle and wild beasts, and to plant and cultivate the luxury of the world. This can never be effected by the enfeebled Opium-eaters of Assam, who are more effeminate than women. I have dwelt thus long on the subject, thinking it one of great importance, as it will affect our future prospects in regard to Tea; also from a wish to benefit this people, and save those who are coming here, from catching the plague, by our using timely measures of prevention.

Monthly outlay of the present standing Establishment.

	Co's.	*Rs.*	
Superintendent, ...	500	0	0
1st Assistant to Do.	100	0	0
2nd Do. Do.	70	0	0
1 Chinese Black-Tea maker, ...	55	11	6
1 Ditto Assistant to Ditto	11	1	6
1 Ditto Tea-box maker, ...	45	0	0
1 Ditto Interpreter, ...	45	0	0
1 Ditto Tea-box maker, ...	15	8	6
2 Ditto Green-Tea makers, at 15 : 8 : 6 each, ..	31	1	0
1 Ditto Tea-box maker, ...	33	4	6
1 Ditto Lead-canister maker, ...	22	3	0
24 Native Black-Tea makers, at 5 each ,.. ..	120	0	0
12 Native Green-Tea makers, at 5 each, ...	60	0	0
1 Native Carpenter, ...	4	0	0
1 Coolie Sirdar, ...	10	0	0
Carried over,...	1,122	14	0

Brought over, . .	1,122	14	0
4 Mahouts, at 6 each, ...	24	0	0
4 Ditto Mates, at 4 each, ...	16	0	0
Rice for 4 Elephants per month, ...	18	0	0
4 Sawyers, at 4 each, ...	16	0	0
2 Dâk runners, at 3 : 8 : 0 each, ...	7	0	0
4 Duffadars, at 3 each, ...	12	0	0
Fixed monthly expenditure in Assam, ...	1,215	14	0
Cash paid to Chinese families in China, . .	131	2	6
Total monthly expenditure,	1,347	0	6

or 16,000 a year, not including coolies and other items. It should be remembered that this establishment has been confined to a few tracts as an experiment, and has never been fully worked. The Chinese Green-Tea makers, Canister-makers and Interpreter, have lately been added to the establishment; their services have not as yet been brought into account. We are just now availing ourselves of them by making Green-Tea; and as the natives at present placed under them become available, large quantities of excellent Green-Tea will be manufactured. I suppose two Chinamen might qualify twenty-four natives for the first process; the second, as I have already recommended, might be performed in England, which in my humble opinion would effect a great saving, by getting machinery to do the greater part of the work. At all events, it never could be manufactured in Assam without a great expense, and this for want of labourers. However, it is gratifying to see how fast the Chinese acquire the Assamese language; for, after they have been a year in the country, they begin to speak sufficiently well for all ordinary purposes, so that an interpreter can very well be dispensed with. Our Chinamen can speak the Assamese language much better than the interpreter can the English language. They are a violent, headstrong, and passionate people, more especially as they are aware we are so much in their power. If the many behave as do the few, a Thannah would be necessary to keep them cool.

With respect to what are called the *Singpho* Tea tracts, I am sorry to say we have not been able this year to get a leaf from them, on account of the disturbances that have lately occurred there; nor do I believe we shall get any next year, unless we establish a post at *Ningrew*, which I think is the only effectual way to keep the country quiet, and secure our Tea. The Tea from these tracts is said by the Chinamen to be very fine. Some of the tracts are very extensive, and

many may run for miles into the jungles for what we know; the whole of the country is capable of being turned into a vast Tea garden, the soil being excellent, and well adapted for the growth of Tea. On both sides of the Buri-Dehing river, as will be seen by the map, the Tea grows indigenous; it may be traced from tract to tract to *Hookum*, thus forming a chain of Tea tracts from the Irrawaddy to the borders of China, east of Assam. Ever since my residence at Sudiya this has been confirmed year after year by many of my Kamtee, Singpho, and Dewaneah acquaintances, who have traversed this route. It is therefore important for us to look well to our Eastern frontier, on account of our capability to extend our Tea cultivation in that direction. England alone consumes 31,829,620 lbs. nearly four laks of maunds, annually. To supply so vast a quantity of Tea, it will be necessary to cultivate all the hills and vallies of Assam; and on this very account a post at *Ningrew* becomes doubly necessary. A few years hence, it may be found expedient to advance this frontier post to the top of the *Patkai* hill, the boundary line of our eastern frontier. Any rupture with Burmah would add to our Tea trade, by taking from them *Hookum* and *Munkoom*, and having the Irrawaddy as our boundary line. These countries are nominally under the Burmese, as they pay a small annual tribute; but this can never be collected without sending an armed force. They are said to be thinly inhabited, the population being kept down by the constant broils and wars, which one petty place makes upon another for the sake of plunder. All the inhabitants drink Tea, but it is not manufactured in our way; few, it is said, cultivate the plant. I have for years been trying to get some seeds or plants from them, but have never succeeded, on account of the disturbed state in which they live. The leaves of their Tea plants have always been represented to me as being much smaller than ours.

Muttuck is a country that abounds in Tea, and it might be made one extensive, beautiful Tea garden. We have many cultivated experimental tracts in it; we know of numerous extensive uncultivated tracts, and it appears to me that we are only in the infancy of our discoveries as yet. Our Tea, however, is insecure here. It was but a month or two ago that so great an alarm was created, that my people had to retire from our Tea gardens and manufacture at Deenjoy and Chubwa, which will account for the deficiency of this year's crop. Things must continue in this state until the government of the country is finally settled; for we are at present obliged, in order to follow a peaceful occupation, to have the means of defending ourselves from a sudden attack, ever since the unfortunate affair at Sudiya. Before the transfer of the Tea tracts in this country can be made, it will be

necessary, in justice to all parties, to know if *Mutluck* is, or is to become, ours or not. The natives at present are permitted to cultivate as much land as they please, on paying a poll-tax of two rupees per year; so that if the country is not ours, every man employed on the Tea will be subject to be called on for two rupees per annum, to be paid to the old Bura Senaputy's son, as governor of the country. This point is of vital importance to our Tea prospects up here. Many individuals might be induced to take Tea grounds, were they sure, that the soil was ours, and that they would be protected and permitted to cultivate it in security.

In looking forward to the unbounded benefit the discovery of this plant will produce to England, to India,—to Millions, I cannot but thank God for so great a blessing to our country. When I first discovered it, some 14 years ago, I little thought that I should have been spared long enough to see it become likely eventually to rival that of China, and that I should have to take a prominent part in bringing it to so successful an issue. Should what I have written on this new and interesting subject be of any benefit to the country, and the community at large, and help a little to impel the Tea forward to enrich our own dominions, and pull down the haughty pride of China, I shall feel myself richly repaid for all the perils and dangers and fatigues, that I have undergone in the cause of British India Tea.

JAIPORE,
10*th June*, 1839.

ART. VIII.—*Proceedings of the Asiatic Society.*

(*Wednesday Evening, the 7th August*, 1839.)

The Honorable Sir E. RYAN, President, in the chair.

Read the Proceedings of the last Meeting.

Read the following letter from Professor WILSON:—

Library, East India House, London, 12th April, 1839.

DEAR SIR,—The continued serious illness of Mr. J. PRINSEP, and the uncertainty of its termination, render it impossible to communicate with him on the affairs of the Asiatic Society, and I must therefore trouble you on a subject on which he wrote to me on the Society's behalf sometime ago. Under the authority I then received, I applied to Sir F. CHANTREY to furnish the Society with a copy of his bust of Mr. COLEBROOKE, and of one of Sir W. JONES, from the head of the statue in St. Paul's Cathedral. Both have been prepared under his superintendence by a sculptor of great merit, his pupil Mr. WEEKES, and are nearly completed. The cost is severally sixty

and seventy guineas, (136*l.* 10*s.*) and it should be paid as soon as the busts are removed. I am not aware however if any arrangement has been made to remit the above sums, although I apprised Mr. PRINSEP of the amount. His lamented indisposition, and hurried departure from India, will probably have prevented him from taking any steps on the occasion. If the remittance has been made, I shall be obliged to you to inform me in what manner; if not, as is most likely, I shall be obliged to you to obtain the authority of the Society to the money being sent me without delay.

It is very probable that a similar omission may have occurred in regard to the amount of Dr. MILL's bust, which you will therefore be kind enough to correct by forwarding the amount either to him or to me The plaster model of his bust is completed, and is most excellent, both as to its general character and individual resemblance. It and the other two will form most admirable, as well as appropriate decorations of the Society's apartments.

Yours very truly,
H. H. WILSON.

The Secretary informed the Meeting that the draft for 136*l.* 10*s.* has been remitted to Dr. WILSON by the last Overland; and that subsequent inquiry had shewn that Mr. PRINSEP had a larger sum than that required at the credit of the Society in the hands of his London Agents.

Read a letter from J. FORSHALL, Esq., Secretary to the British Museum, acknowledging receipt of No. 80 of the Journal Asiatic Society.

The Secretary brought to the notice of the Meeting that the present Pundit, RAMGOVIND GOSSAMEE, has been found incompetent to decypher the Inscriptions to which the Society are most desirous to give publicity, either in their monthly publication, or in their Transactions, he therefore proposed that the celebrated KAMALAKANTHA VIDYALANKA be appointed for that office, and also as the Librarian for the Oriental Books.

The proposition was unanimously carried.

Library.

The Secretary informed the Meeting of the arrival of several books selected by Professor WILSON and Dr. CANTOR, amounting in cost to 63*l.* 4*s.* 6*d.*, as per list forwarded by the booksellers, Messrs. ALLEN and Co.

Lindley's Fossil Flora, 3 vols. 8vo. boards.
Agassiz' Fossil Fishes, Parts 1 to 9 and 11, folio and 4to.
Russell's Fishes of the Coromandel Coast, 2 vols. folio.
Russell's continuation of the Coromandel Serpents, 2 vols. folio.
Cuvier and Valenciennes Histoire Naturelle des Poissons, vols. 8, 9, 10, 11, and 12.
Do. additional plates, to vol. 11, 8vo.
Crouch's Introduction to Lamarck's Conchology, coloured 4to. boards.
Gould's Himalayan Birds, 1 vol. imperial folio.
Lardner's Cabinet Cyclopædia—*from the Booksellers.*

Literary and Antiquities.

Read the following reply from Government to the request of the Society for a subscription for a certain number of copies of the "*Sharya-ul-Islam*," which the Society has undertaken to print in conjunction with the Nawab JABAWUR JUNG.

To the Officiating Secretary to the Asiatic Society.

General Dept.

SIR,—I am directed to acknowledge the receipt of your letter dated the 2d May last, and in reply to inform you, that the Honorable the President in Council will take 25 copies of the *Sharya-ul-Islam* at 20 Co's Rs. per copy, for the use of the Seminaries of education which give instruction in Arabic Law. On the receipt of the copies the necessary orders will be issued to discharge your bill on presentation at the General Treasury.

I am, Sir,

Your obedient servant,

Council Chamber, 24th July, 1839. H. T. PRINSEP,

Secy. to Govt. of India.

Read a letter from Captain P. GERARD, forwarding two boxes of stone Idols discovered by his late brother, Dr. J. G. GERARD, and Lieut. Col. Sir Alexander BURNES, near *Manikayala*, on their route to India, 1833 and 1834.

'I take this opportunity of acquainting you for the information of the Asiatic Society, of having despatched by water two boxes to your address, to the care of my agents Messrs. COCKERELL and Co., who shall be apprized of the same. One is a large square box containing a Stone Idol in excellent preservation and beautifully executed, and complete excepting the face of one of the female figures, which is wanting. The face of the other female figure was accidentally broken off, but it has been carefully packed up in paper, and with a little cement it can easily be united, and appear as if nothing had occurred to it.

'The other is a small square box containing fragments of Idols. The whole were dug for at considerable expense in Afghanistan, at or somewhere near *Manikayala* by my brother, the late Dr. J. G. GERARD, while he was on his return route to India, during 1833 and 1834, from *Meshid* in Persia, where he separated from his companion and fellow-traveller, Lieutenant (now Lieutenant Colonel) Sir Alexander BURNES, Kt. May I therefore request that you will do me the favour of presenting the contents of both boxes on their arrival, to the Asiatic Society on my part, as having been the discoveries of my brother, the late Dr. J. G. GERARD.

'I regret to say that no particulars of their locality were found amongst my late brother's voluminous MS. papers, relating to his interesting journey, owing unfortunately to the circumstance of two-thirds of the whole having unaccountably disappeared, or been lost, which is much to be regretted, as they contained valuable information respecting *Heerat* and *Kandahar*, and the countries between *Meshid* and *Cabul*, especially about the resources of these parts, their trade, manufactures, and productions. What remained of his papers (with the exception of his meteorological observations during his absence from the end of 1831 and beginning of 1832, till March 1834, which I shall take an early opportunity of transmitting to the Society for publication at this interesting period,) were forwarded to Europe in 1836.

'Last year I was promised the necessary information respecting the Idols from Moonshí MOHUN LAL, but not having received it, I was unwilling to delay their dispatch any longer. Should he favour me with any particulars on the subject, I shall have great pleasure in communicating the same to the Society.

'P. GERARD, *Captain.*'

The boxes and contents were safely received. The thanks of the Society were voted to Capt. GERARD for this acceptable donation.

A stone Pillar of exquisite beauty and genuine Hindu style, considered to belong to the 13th century, was presented by Mr. W. S. ALLEN, by whom it was discovered with several fragments of a ruined temple, &c., on one of the shallows near *Pubna*. Lieut. KITTOE has undertaken to prepare an account and drawing of this Pillar for the next number of this Journal.

Translation of a play exemplifying the popular tone of the Burmese Drama was presented by Mr. BLUNDELL.

Physical.

Daily Observations of the Tide at Singapore for February, March, and April, 1839.

With reference to the resolution of the Meeting held on the 2nd January last, the Secretary apprised the Meeting that he had received a letter from Messrs. TAYLOR and WALTON, stating that they will supply such impressions of their Anatomical Wood-cuts as the Society may require.

Upper Gower Street, May 7th, 1839.

SIR,—Your letter of the 10th of February to DR. QUAIN on the subject of the Illustrations in his Elements of Anatomy has been handed to us. In reply, we beg to inform you that we shall be happy to forward the views of the Society by supplying whatever number of impressions from our engravings the Society may require. As much of the work in the Wood-cuts is very delicate, we should run a great risk of seriously injuring the blocks, by attempting to take casts from them. On this account we are prevented furnishing the metal casts, but the former plan we shall be happy to carry out in any way the Society may desire. We think your work would be much improved by the engravings being worked in this country, as the appearance of a wood-cut depends quite as much upon the printing as upon the engraving, and of course wood-cut printing has as yet been but little attended to in India. If you determine upon having the impressions, perhaps you will have the kindness to send us the following particulars :—

1st. The size of the volume for which the Plates are required.

2nd. The Number of Copies required.

3rd. The arrangement you would wish of the subject; how many on each plate; and in what order?

4th. Whether you would require the same number of the steel plates of the Brain, &c.

We remain, Sir,

Your obedient servants,

TAYLOR AND WALTON.

P.S. Presuming your work to be in demy 8vo. we would supply you with Impressions from our cuts upon the following terms:—

For 500 Sets, supposing each set occupied 5 sheets demy 8vo. printed on one side only (in all 40 pages of cuts,) 37*l.* 10*s.* which sum would include the use of the Blocks, Presswork, and Paper.

	£	*s.*	*d.*
For 1,000 ditto ditto ditto, ...	67	10	0
The four steel plates of the Brain would cost you, including Paper, Presswork, & use of Plates for 500 impressions 4 plates demy 8vo.	8	8	0
1,000 ditto ditto ditto, ...	16	16	0

To W. B. O'SHAUGHNESSY, ESQ.

Resolved—That Messrs. TAYLOR and WALTON be requested to send 1000 copies of each set of plates.

[It will be remembered that these plates have been requested for the illustration of the "*Shanra Vidya*," or Sanscrit translation of "Hooper's Anatomist's Vade Mecum." The thanks of the Society were directed to be proffered to Professor QUAIN for his liberal aid in acceding to their request.]

Read a letter from Dr. J. T. PEARSON, forwarding an account of the *Bora chung*.

Read a letter from Dr. G. G. SPILSBURY, forwarding a specimen of a vein of Coal found close to the surface, about nine miles from Jubbulpore.

To the Secretary to the Asiatic Society.

SIR,—Herewith I beg to transmit specimen of a vein of Coal found close to the surface, about nine miles from this station.

It was first brought to notice by Mr. C. FRASER, the Agent of the Governor-General for these territories, who received his information from a *Faquir*, by whom he was informed that at a place a few hundred yards above *Lametur Ghat*, on the Nerbudda river, when the stream was at its lowest, (Charcoal stone, as he phrased it) was to be found, and that on applying fire it ignited.

Mr. FRASER and self visited the spot, situated near the middle of the river, and some 30 or 40 square yards, apparently the vein has also been traced on both sides of the river. Several of the residents have had hackery loads brought in, and find it answer well for domestic and culinary purposes. The blacksmiths are very unwilling to use it, and declare there is not sufficient heat from it to smelt iron.

I have no doubt that were a proper shaft sunk, Coal of good quality would be found, and equal to that discovered by Major Ouseley near *Garrahwarrah*, and on which such a good report was lately made in comparative trials at Bombay.

I have the honor to request you will present the specimen to the Society, and shall be glad to learn the result of its analysis. I remain, &c.,

GEORGE G. SPILSBURY.

Jubulpoor, 29th June, 1839.

The analysis of this Coal has been duly made, and the results will be published, with several similar analyses in an early number of the Journal.

Read a letter from Dr. H. H. SPRY, forwarding on behalf of Captain F. JENKINS, Political Agent of Assam, for presentation to the Society, specimens of rocks and minerals of the county of Cornwall, as well as other parts of England.

GENTLEMEN, *Calcutta, August 6th*, 1839.

I do myself the pleasure of forwarding for presentation, at the approaching Meeting of the Asiatic Society, the accompanying specimens of the geology of the county of Cornwall, as well as other parts of England, on behalf of Captain JENKINS, the Political Agent of Assam; and for him I have to solicit, in return, any duplicate geological specimens the Society may possess for presentation to the Royal Institution of Cornwall. In this request I beg to join with Captain JENKINS, as we both feel assured that the rich stores which the Cornish Museum contains will be readily made available to the improvement of the Asiatic one, and an interchange thus be effected which will prove of mutual benefit.

I beg further to add, that should the Society be pleased to accede to this proposal, that I shall be happy to be the medium of communication between the two institutions, so far as assisting in facilitating the transmission of the specimens.

HENRY H. SPRY.

The Joint Secretaries of the Asiatic Society of Bengal.

The thanks of the Society were voted to Captain JENKINS, and the Curator was requested to form a suitable series of the Museum duplicates for presentation to that officer. With reference to this and some similar communications, the President observed that he was very desirous of recording his opinion that the correspondence of the Society, should on all occasions pass through the Secretaries, the regular and usual channels. Direct correspondence emanating from other officers of the Society he considered informal. He thought, for example, that all correspondence relative to the Museum should pass through the Secretaries, and he proposed a resolution to that effect, which was seconded by Mr. H. T. PRINSEP, and carried unanimously.

Dr. M'CLELLAND presented some specimens of Mineral Ore with the following note :—

SIR,—I did myself the pleasure, some time last month, of forwarding to your address, a small package containing two or three specimens of Jasper and Asbestos, and one of Iron ore, entrusted to my care, when at Ferozepore, by Mr. C. MASSON, who told me that he had almost forgotten they were amongst his baggage, not having paid much attention to what was packed up by his servants when leaving Kabul. I had mislaid his ticket for the specimen of the ore, which I now enclose, lest I should have made any mistake in my own label, as to the place from whence the ore was obtained.

I beg to add that the ore is nearly similar, but not quite so pure or rich looking, as that obtained from the mines in the southern portion of the Busahir state.

GEORGE JEPSHON.

Meerut, July 27th, 1839.

Mr. H. T. PRINSEP recalled the attention of the Society to the proceedings of the Meeting of the Society held on the 6th September, 1837. Mr. JAMES PRINSEP had appropriated the sum of 1500 francs (equivalent to Co's. Rs. 625) remitted by the Minister of Public Instruction in France, in procuring from Benares

copies of the *Vedas* which were sent to France, as prepared, through Capt. A. TROYER, agent of the Society in Paris. Since Mr. JAMES PRINSEP's departure for England several further *Pothis* have been sent down, and are now ready for transmission. The sum advanced has been exceeded by the charges for copying, and the balance has been paid from Mr. JAMES PRINSEP's private funds, not from those of the Society. The copies in sheets were ready to be sent to Europe, and the account prepared from Mr. JAMES PRINSEP's private books of sums remitted by him to JUDDOONATH PUNDIT at Benares, shews an amount of Rs. 233: 7: 9, as the balance due by the Government of France; part of this amount however, viz. Rs. 196: 3: 6, was advanced at Benares from funds realised there by sale of the Society's Oriental publications, as shewn in the account of Messrs. TUTTLE and CHARLES, Mr. JAMES PRINSEP's Agents. It remains for the Society now to declare whether the copying for the French Government shall be considered as a private transaction between Mr. JAMES PRINSEP and the French Government, or as executed by him as Secretary to the Society. In the former case, the balance 196: 3: 6, will be paid into the Society's Treasurer's hand, and the copies of the *Vedas* now ready, will be sent on Mr. JAMES PRINSEP's private account, with a claim for the balance from that Government; but if the Meeting consider the transaction as their own, then the Society will have to pay the difference between Rs. 196: 3: 6 and 233: 7: 9, viz., 37: 4: 3, to Mr. JAMES PRINSEP's agents, and to forward copies of *Vedas* officially through their Secretary to the Agent in Paris.

Resolved unanimously—That the transaction is one which appertains to the Society; that the copies of the *Vedas* be taken over, and the account closed.

The Honble. Mr. BIRD exhibited to the Meeting a sketch of the Camel carriage in which Mr. BIRD, of Allahabad, had recently made an official tour of 2000 miles in Upper India.

This sketch, with some papers on the subject, will appear in our next number.

Read extracts from a letter from Baron HUGEL to the address of MR. JAMES PRINSEP.

'*Kritzing, near Vienna, Dec.* 25, 1838.

'I have received a few days ago, the four numbers of your Journal, Nos. 72 to 75, and I cannot find words to express the interest I took in following from the beginning to the end, your extraordinary discoveries. It is really worthy of your spirit, of your genius, to come to a fact of such immense consequences for history, but I think it proves more than any thing else, of no direct intercourse between what is called the *Peninsula* of India and Egypt—I mean of no trading vessels from Berenice to any port of the Malabar coast. I don't believe in long voyages without sails in those days, and the knowledge the Greeks and Egyptians possessed of India is much better explained in the tablets of Girnar, than by the idea of savants travelling for information without the vanity of telling it in their works. But when really Mission-

aries went to Egypt and Greece it is astonishing that nothing of this truly interesting fact should have been mentioned in any work of a Greek author. But this may be as it is, I am sure that you are only at the beginning of your work, and that we may look for real Indian history, from the time of Alexander the Great, at least, to the invasion of the Mohamedans.

'It is a considerable time I did not write to you, my dear Sir, but I was afraid to take away from your valuable time, which you employed even beyond my expectations: but if I did hesitate any longer to send you a few lines, I am afraid I could be entirely escape your memory. I take the liberty at the same time to send you for the Society (if you think it worthy) "the Fishes of Kashmir," found by myself in the valley, and brought home with me. I am sorry that it is in German, but as it is my *native tongue*, I think it my duty to publish in it. There is another work now printing, which I hope will prove a good one: it is "Kashmir and the Sihks" in four volumes.

'I beg your being good enough to send for the subscription money for the Journal to Gillanders and Arbuthnot: it happened once (just one year ago) that I was obliged to pay 9*l*. 17*s*. for four numbers of your Journal, *postage* from Calcutta to London: it was sent me from thence to Vienna by an Austrian Courier: I made all kind of remonstrances, but without success. "*Pamphlets only*" not having been written on the address, the Post Master General would not hear of a reclamation.'

'C. H. HUGEL.'

[Some desultory conversation took place before the Meeting separated, as to the interruption of the Meteorological Register so long published in the Society's Journal. It has been kept chiefly by Mr. GREENWAY, an assistant in the Calcutta Assay Office, who was trained by Mr. PRINSEP to the use of his unrivalled instruments, and to the correction of their indications by special tables now in Mr. GREENWAY's possession, Mr. PRINSEP had, moreover, as a parting request, urged Mr. GREENWAY not to discontinue observations which had acquired standard value in the estimation of all Meteorologists. Mr. CURNIN, the acting Assay-Master, has however deemed it necessary to prohibit Mr. GREENWAY's devoting any portion of his time to this employment, and Mr. CURNIN is further unwilling to allow Mr. PRINSEP's instruments to be removed from the Mint to any other establishment. Under these circumstances, Mr. REES, of the Surveyor-General's Office, has most liberally permitted his Registers to be made use of by the Society. We have already published that for July. The Barometrical observations are made with a first rate Troughton.

We have taken measures for having the instrument accurately compared with others which have been adjusted by the Royal Society's standard, and the reductions to 32° will be duly calculated for quarterly periods. We propose too to add to the Register a daily double observation of the boiling point of water, taken with an excellent Thermometer, recently sent out to Mr. JAMES PRINSEP's order. This seems to us a desideratum of much importance.

It is but justice, nevertheless, to Mr. CUNNIN to add, that that gentleman considers the continuance of the observations to interfere with the duties of the Assay Office, and that he has offered to permit any competent person to attend at the Mint for the purpose. This arrangement, however, would be attended with so much expense and inconvenience, that it becomes absolutely impracticable.—EDS.]

JOURNAL

OF

THE ASIATIC SOCIETY.

No. 91.—JULY, 1839.

ART. I.—*Specimen of the Burmese Drama, translated by* J. SMITH, ESQ, *communicated by* C. A. BLUNDELL, ESQ. *Commissioner, &c., Moulmein.*

MY DEAR SIR,—I have the pleasure to send you a translation of a play, which notwithstanding its trifling vein, may attract the notice of the curious, as exemplifying the popular tone of the Burman drama. The Ramadzat, (Ramahyana) and other ancient fabulous histories, form the groundwork of nearly all the favourite plays, the outline of the story being merely preserved, while the language of the play depends as much upon the fancy of the performer as the taste of the audience. Each company is presided over by a teacher or manager, who drills the actors in their tasks from rough notes which contain only the songs and the substance of the parts assigned to each performer. In every play, without perhaps a single exception, the following characters are represented—a King, a Queen, a Princess, a Minister of State, a Huntsman, and some kind of Monster. The female characters are usually personated by men, it being considered indecorous in a woman to appear as an actress. I have to plead as an apology for the unpolished style of this translation, the acknowledged difficulty of turning the dialogue of a play into a foreign dress; moreover the original, which was written from the mouth of an actor, was imperfect and ill-written. I believe there are books in the palace at Umerapooree, containing the proper reading of all the approved plays and the costumes of the characters, which are placed near the

members of the royal family whenever they call their companies before them, but I have not been able to discover any work of this description here.

Yours sincerely,

J. SMITH.

To C. A. BLUNDELL, ESQ.

The Argument.

The nine princesses of the city of the silver mountain, which is separated from the abode of mortals by a triple barrier (the first being a belt of prickly cane, the second a stream of liquid copper, and the third a *Beloo,* or devil) gird on their enchanted zones, which give them the power of traversing the air with the speed of a bird, and visit a pleasant forest within the limits of the south island (earth.) While bathing in the lake, they are surprised by a huntsman, who snares the youngest with his magic noose, and carries her to the young prince of Pyentsa, who is so much struck by her surprising beauty, that he makes her his chief queen, though he has but lately been united to the daughter of the head astrologer of the palace. Being obliged soon after to take the field against some rebels, the astrologer seizes advantage of the prince's absence to misinterpret a dream, which the king calls upon him to explain; and declares that the evil spirit, whose influence is exerting itself against the king's power, is only to be appeased by the sacrifice of the beautiful Mananhurree, who has supplanted his daughter in the young prince's affections. The prince's mother hearing of the offering about to be made, visits the lovely Mananhurree and restores to her the enchanted zone which had been picked up on the shore-edge of the lake by the huntsman, and presented by him to the old queen. The princess immediately returns to the silver mountain; but on her way thither, she stops at the hermitage of a recluse, who lives on the borders of the delightful forest before mentioned, and gives to the old man a ring and some drugs, which confer the power upon the possessor of them of entering the barrier and passing unharmed through its dangers. The young prince having put an end to the war, returns to the city of Pyentsa, and finding his favourite queen gone, he instantly sets forth in quest of her. Having come to the forest, the appearance of which astonishes and delights him, he dismisses his followers and visits the hermit, who delivers to him the ring and the drugs; he then enters the frightful barrier, and after meeting with many adventures, arrives at the city of the silver mountain, and makes known his presence to his beautiful bride by dropping the ring into a vessel of water, which one of the palace damsels is conveying into the bath of the princess.

PERSONS.

The King of Pyentsa.
The King of the city of the silver mountain.
Thoodanoo, the Prince of Pyentsa.
A skilful Huntsman.
An Astrologer.
A Hermit.
The Queen of Pyentsa.
Mananhurree, the daughter of the King of the silver mountain, and wife to Thoodanoo.
Noblemen, Generals, Guards, Ladies of the Palace, &c., &c.

PYENTSA.

ACT.

SCENE 1st.—*Four Noblemen sitting in the Palace of Audience.*

1st Noble. My lords, let us not be false or neglectful to our royal master, to whom we have so many times sworn allegiance; we bear the weight of government on our shoulders, and constitute the strength of the country,—How shall we conduct affairs, so as to extend his authority, and benefit the state?

2nd Noble. True, my lords; let me explain to you whence our noble monarch sprung. In the distant beginning, after the earth had been destroyed successively by fire, by wind, and by water, the lily which sprung from its bosom blossomed, and produced fine embryo deities, on which account the celestial beings bestowed upon this system the title of Battakat. The various incidents that have occurred from first to last, among the four divisions of the human race, are voluminously recited in the 49000 volumes of the History of Kings, but I will merely give you a sketch. The nine beings who descended from the visible heavens, having eaten of the fragrant earth, peopled it after the manner of mortals;—in process of time, the inhabitants began to use deceit towards each other, to pillage, to steal, and to strive amongst themselves continually; and in order to put an end to these calamities by instruction and discipline, the embryo deity Mahathamata came, and was hailed by the voice of the whole people. This was the first.

3rd Noble. When the millions of worlds had sunk under the influence of fire, air, and water—when the four grand divisions of the creation had been rent asunder—when the system had been again restored, and set in motion—the emerald-leaved lily sprung up, and gave forth from each of its fine blossoms the eight articles of clerical

use; then the beings of the celestial regions understanding the sign regarding the five embryo deities, called this world on which we live Batta (kat).—Is it not so, my lords?

4th Noble. My friends; in the palace of audience, the thirty-three images of superior beings and the images of lions are keeping watch over the throne—the gold, the silver, the emeralds, the flowers, the sapphires, the topazes, and the rubies, are glittering among the other emblems of royalty—the umbrella of state is being spread—the noblemen are in attendance in their robes and helmets—the sovereign of the golden palace is arraying himself in his royal habiliments—the procession will soon be formed to the music of the silver gong, the golden bell, and the celestial harp and lute, and issue forth headed by the four grand divisions of the royal army, marching to the sound of the martial drums;—Let us therefore listen in silence for the warning of the five silver gongs.

[*The royal procession enters.*

King. From the period when the system was destroyed by fire, air, and water, and again renewed, the dynasty which has produced five valorous monarchs has descended unbroken to me, the sovereign of the south island: Are the people happy in the remotest hamlet of my possessions?

Noble. Oh, wearer of the jewelled crown, who unfurleth the royal umbrella, and sitteth on the throne, guarded by rows of lions! the hundred subject kings are in attendance with their daughters.

King. Represent to the sun of the world, truly and quickly, what you have to say.

Noble. Oh, king of the universe, whose merit is matured; whose glory is increasing; whose august coronation has been celebrated; whose merchants and rich men go hither and thither under the royal protection; whose markets, rivers, rivulets, and lesser streams are crowded with people, canoes, and boats passing to and fro; whose royal staff being set up is surrounded by thousands of people going and coming; whose officers of customs, guards, and ferrymen keep watch at the landing places—the Governor of the sea-ward provinces sends a dispatch to the golden city, the contents of which shall be truly conveyed into the royal ear.

ACT.

SCENE 1st.—*City of the silver mountain. The nine princesses in the palace with their attendants.*

Princesses. Shory Tsa! Shory Phee!—ye wise waiting women, who live under the shadow of the single pillared abode of royalty, come with us to the country of Pyentsa.

SCENE 2nd.—*The grove on the borders of the country of Pyentsa.*

SONG.

Oh, bright are the flowers that carpet this vale,
And yield their sweet breath to the murmuring gale;
Bright flowers!—fragrant zephyrs!—how sweet, 'tis to rove,
In this Eden of pleasure—this garden of love.

The Princesses having taken off their enchanted zones, bathe themselves in the lake.

[*Enter Huntsman.*

Hunts. Now, skilful ranger, enter thou the dense forest, and try to discover where the beasts of the chase are most numerous. Let me go quickly, but cautiously.—Ah! what abundance of hares, elks, elephants, leopards, tigers, wild cows, bisons, and bears; there are harpies too, and unicorns, swans, *huoungs*, peacocks, and monkeys frisking about from place to place. Well; this is indeed a wonderful place.—[*He discovers the Princesses bathing.*] Ah! what creatures are these? Mortals, or celestials?—I must instantly entrap one of them with my magic noose, and ascertain what they really are.—[*He casts the noose, and snares Mananhurree, the youngest.*]

Manan. Oh, my royal sisters! save me, save me.

Hunts. Tell me, maiden, art thou a mortal, or a being of a superior order? Speak quickly, I pray you, and relieve me from my doubts.

Manan. I am the daughter of the king whose palace is in the city of the silver mountain, and came hither with my companions to play. Release me, for I am afraid.

Hunts. If so, I shall have my fortune made, for I will carry you this moment to the court of Pyentsa, sweet maiden, and present you to the young prince.

[*Music.*

SCENE 3rd.—*Pyentsa. The palace.*

Enter Huntsman leading in the young Mananhurree to the Prince.

Hunts. Oh, prince, the lord of life and wealth; having but just now snared a palace-fostered maiden of a delicate and gentle form, I have brought her without delay to the golden foot.

Prince. [*To Manan.*] Be not concerned, sweet palace-born child, I could exist with you for ever. Wait; I will hasten to my royal sire and petition him to let me make you my chief queen.

Manan. Do with me, my lord, as you say.

ACT.

SCENE 1st.—*The Hall of the Palace. King, nobles.*

King. Nobles of the palace!

Noble. Lord!

King. Why fails the prince Thoodanoo to come into the presence?

Noble. Oh, ruler of a hundred subject kings,—whose light is like the sun of the universe; he has but even now wedded the daughter of the philosopher Naythoda. The governor of Setang, and the chiefs of Siam and Cochin-China, who have heretofore annually brought tribute, and presents of ingots of gold and silver, white and red cloths, velvets, bales of cloths, gold and silver lace, and gold and silver flowers, have now failed in their duty. Nor is this the limit of their folly; they are making encroachments upon the frontier, and in the pride of their hearts are destroying the villages, and oppressing the people. The confusion which they have created is so great that the inhabitants are afraid to remain on the frontier; an ambassador has only now reached from the Tsaubwas.

King. If this is true, call the lord of the east house (eldest son), and let him appear forthwith!

[*Music.*

SCENE 2nd.—

Noble. Oh my lord, &c. &c. &c. &c.

Prince. Say, what thou hast to say.

Noble. The royal sire has sent to command your presence.

Prince. If I am called, I will but take a glance into the mirrors and adjust my turban, and come with you at once into the audience chamber.

SCENE 3rd.—*The Hall of Audience. Prince, nobles.*

Prince. My lords, tell me, who am the royal son, whose glory is like the sun of day, who enlightens the four islands; whose renown is universally spread; whether the imperial father—the embryo deity whose white umbrella is unfurled—has yet entered the palace of audience;—tell me, too, if the royal mother, who reclineth upon the throne of lilies, has yet displayed her golden countenance, and is well?

SONG.

Wrought o'er with gems, and regal gold,
And glitt'ring flow'rs in ev'ry fold,
There stately canopies reveal,
To kings, who hither come to kneel,
The boundless riches of our land,
Whose rocks are rubies,—gold its sand.
In all the southern world beside,
There is not such a land of bliss;
Where'er the ocean rolls its tide,
It comes not to a shore like this;
Delicious odours fill the air,
And mirth and love reign every where.

[*The King enters.*

Prince. Oh, mighty father, this lion-hearted son, when he received the imperial order, placed it upon his head, and hastened to obey it.

King. My second self, my son Thoodanoo!

Prince. My lord.

King. The people of the whole country, the rebellious wretches, are up like flames of fire—go, and exterminate them.

Prince. (I have heard that) Setang, Siam, and Cochin-China, not fearing the golden sword, are in open rebellion. It is nothing. They seek a quarrel, and the golden son will root up the whole race, without making use of the weapons of war;—he will but publish forth the king's glorious title, and they are gone.

King. Good, my son; go forth and repay to me the favours I have bestowed upon you. Let Cochin-China be your first point of assault, and return not till you come as a conqueror.

Prince. I will reverently obey the royal command, and make the golden cause conspicuous.

SCENE 4th.—*The Prince's palace.*

Prince to Mananhurree. Delicate creature; silver palace-born beauty; whose charms are so surpassingly wonderful; I must go with the army which marches with to-morrow's dawn.

Manan. Oh, my lord, why will you thus desert me? You are my only protector here, at once my father, and my husband. If indeed you have resolved to abandon me, I must bear the fate that awaits me.

Prince. It must not be so, pride of my soul. I must not neglect the duty which a child owes its parent: moreover, consider, I beseech you, that I am nearest the throne, and must yield to the custom of my country, and lead the army against the rebels.

Manan. Alas! If you possess so little affection for me, as to leave me here alone, I must submit to my evil destiny.

Prince. [*To his Noble.*] Hear you not my lord? She does not say, stay; nor does she desire me to go!—she weeps!—her tears and smiles are so fascinating, that I shall be vanquished; her tears are like sparkling drops of dew upon the leaf of the lily; whenever I look upon them, I have not resolution enough to go.

Noble. Let me explain to your highness. The princess is here without friends; if you desert her, she will be as much alone as the *kynneya* without its mate; she will be confounded with her lot, and will be no more than a waxen image. There is indeed no necessity for your departure, and leaving her here in tears.

Prince. Alas! If I avoid this campaign, I shall have my name held up to the scorn and contempt of posterity. The king, my father, will be enraged against me if I do not accompany the army. Oh, I must indeed depart. Then this friendless one! when left alone, will break her heart, and I shall be left destitute. I am in a painful dilemma, (like a bamboo between two boards)! I may as well swallow poison, or throw myself into a furnace. If I petition the king to allow me to remain at home, he will order me to do so; but after what I have already promised it will be improper to ask!—then she will not die!—she will only waste away. I *will* join the army;—caparison my elephant Mengala, and bring him to the palace, and the lord of the golden universe will depart.

SCENE 5th.—*The Prince's Palace. Princess, attendants.*

Manan. Mala, Maensa! my faithful maidens come hither; for the time of my pregnancy is completed.

Maensa. [*To the Treasurer.*] Here is our royal mistress at the time.

* * * * * * * * * * * *

[*The child is born.*

Treas. I must hasten to the camp, and communicate the tidings to the royal ear.

ACT.

Camp.

Treas. Oh, my lord! the empress sovereign of the state!

Prince. Speak, my lord.

Trea. I am come to communicate to the golden ear, that the Princess Manan has been delivered of a son.

Prince. Then I will forthwith return, and look upon my little son.

ACT.

Scene 1st.—*The Prince's palace.*

Prince. Gem of my heart, tell me! tell me, if you are well!

Manan. I am well, my lord.

Prince. [*To his lord in waiting.*] Make known to all the army, that the little prince has received the name of Moung Shory Gyew. [*To the princess.*] Pure leaf of silver, captivating creature, picture of softness and beauty, mother of our babe—stay but for a brief space with your companions, my concubines, in the palace, and I will again be with you in three months.

Manan. Pray do not be concerned about me, my lord, I will stay here; commence your journey, and be true to me.

Prince. You say well, my rose tree, but it is not my own wish to depart; I must obediently perform my sire's command; of course I must not avoid my duty.

Scene 2nd.—*The Prince's palace. Princess, attendants.*

Manan. Oh, my maids; the little prince is now seven days old, let us place him in the emerald cradle and rock him (to sleep.)

SONG.

Gently let us rock the swing,
And hush to sleep the baby king:
Palace maidens—softly sing,
(*Chorus*) And lull to sleep the baby king.

2

Coolly let the palace rose
In his jewell'd couch repose:—
Persuasive voices, hither bring,
(*Chorus*) And lull to sleep the baby king.

Scene 3rd.—*Palace of Audience.*

King. Oh, wise ministers, who continually wait in my presence like the seven mountains which surround the lake Nandat!—I have dreamt that the country of Pyentsa was surrounded by my intestines, and that the sun and moon descended from the firmament and fell into my lap. Explain quickly what this means.

Noble. Oh, king of the golden palace, whose glory is great, the Brahmin Naythoda, whose place is near the throne, will be able to understand the dream.

King. Call hither the Brahmin Naythoda. [*Naythoda and his disciple enter*] Oh, learned teacher, I have dreamed that my bowels surrounded the country of Pyentsa, and that the sun and the moon fell at my feet. Show me the interpretation of this thing.

Naythoda. It is well, Oh benefactor!—let me but consult my astrological tables; [*he consults his scheme,*] one from one—nothing; nine from one—nothing; two and five.—I have made the calculation—[*the Pawn tumbles in the water,*] Oh! are there nine, or one? [*To his scholar,*] The benefactor dreams propitiously, but I will divine unfavourably. [*To the King,*] The benefactor, the lord of life and property, must sacrifice to the Yeet spirit one hundred fowls, and one hundred hogs, and it will be appeased.

King. Is this all, Oh teacher?

Nay. Lord of the earth, I am afraid to—

King. Say on, learned teacher, without regard to any one; only let myself and the chief queen be exempt.

Nay. Oh! benefactor, cut the throat of that celestial spirit who is like the *kynneya*, and offer up her blood before the Yeet Nat. [*To his disciple,*] Close the doors of the prince's palace on all sides, for so is the king's command.

SCENE 4th.—*The Prince's palace. Princess, attendants.*

Manan. Oh, my faithful women, Mala! Maensa! go and take your rest. My doors are closed, and my blood is to be poured out before the Yeet spirit——must it indeed be so? Oh, my absent lord, our son Moung Shory Gyew is yet an infant.

SONG.

[*Enter the Prince's Mother.*

Queen. Oh, daughter of the pleasing countenance! here is your enchanted zone;—take it, and escape to the city of the silver mountain.

Manan. Thanks, royal madam; thrice I salute you reverently.

SONG.

ACT.

SCENE 1st.—*At the hermitage of a recluse who lives on the boundary which divides the earth from the country of the silver mountain. Princess. Recluse.*

Manan. Holy hermit, should the Prince of Pyentsa come hither, deliver, I pray you, this ring and these drugs into his hand.

ACT.

SCENE 1st.—*The Prince's camp.*

Prince. By the strength of this arm have I made my father's glory great. Cause my elephant Yauoung to be caparisoned, for the princess Dwaynow's lord will return to the city of Pyentsa.

Noble. My lord !

Prince. Let the golden spearsmen, swordsmen, and the golden shield-bearers and armour-bearers be set in order, and the four grand divisions of the imperial army.

Noble. They are so, my lord.

Prince. Good general, the princess Manan, who keeps her court in the north palace, will bend her head in watching for my return like the golden lily shaken by the wind—she will droop with fatigue, let us therefore make long marches.

SCENE 2nd.—*Camp near Pyentsa. The army returning.*

Prince. Oh, my lord, I cannot sleep;—when the army reaches the garden near the city, let the artillery discharge a salute.

SCENE 3rd.—*The Prince's palace. Matrons, waiting women.*

1st Lady. Our royal mistress upon hearing of the plot against her life, fled to the city of the silver mountain—we shall all without exception undergo the royal punishment.—Hear you not the voice of the great guns? Let us go forth and meet the returning army.

Camp.

Prince. Oh, sweet ladies Mala, Maensa ! the princess Manan, where is she? The charming mother of our infant son—where is she gone?

Matron. I will explain, my lord, about the princess, to whom I gave the same care, as to this hair I daily dress—she who was the celestial spirit of the palace, oh king of the city of the sun.

The royal father having had a dream sent for the astrologer, who cherishing resentment and malice towards your highness, purposed to offer up the mother of Shory Gyew as a sacrifice to the Yeet Nat, upon hearing of which she forsook the palace and returned to her own country.

Prince. Ah ! The love that is felt for the father should be extended to the child. I was absent; would that I had been present ! My little son Moung Shory Gyew has not even quitted his mother's breast !—I have had no regard paid to me in my absence—Manan and myself are one. I am the head of this royal line, my son Shory Gyew

is the king's grandson, and my queen was his daughter-in-law. ——— Let me brood over all this!———I swear, by the sacred books, that I will remain here no longer. Oh, attendants! every one of ye! let none be absent!————the lord of the mundane circle will journey towards the silver mountain,—let the huntsman be called into the presence.

Noble. Thy servant, the huntsman, has been called, and is now here.

Prince. Oh! quickly show the golden prince, who rules this universe, the land they call the silver mount, whence came the mother of my son; and quickly show the rural lake, in which thou did'st thy captive take.

Hunts. The country of the silver mount! I know not where it is, my lord.

Prince. Then quickly bring me to the delicious pool in which thou foundest the mother of Shory Gyew—the prince has never yet been there. Oh huntsman rise, without delay, and bring the prince upon the way.

Hunts. My lord, I will begone.

ACT.

They enter the Haywonta Forest.

SONG.

These plashing colours surely come,
Reflected from the upper sky,
Where Tawadyn's celestial dome,
Is hidden from the mortal eye.

Prince. Look, my lords, at the delightful bath of the mother of Moung Gyew! how beautiful the flower trees that grow upon its banks, and what a delicious perfume they diffuse through the forest; the woods are dense with leaves, which form a dusky shade in which are sporting butterflies, beetles, and bees. Water-quail, kingfishers, and pheasants nestle beneath the shadow of those golden lilies. How pleasant and exhilarating, my good huntsman.

Hunts. True, my lord, indeed most pleasant; I dare not venture to number all the beautiful flowers that grow in the lake.

Prince. I see by your countenance, that if I demand their names you will be wearied in telling them.—You may now make your way back to the city.

Prince. [*Alone*] Oh, my dear lost wife! take me with you, for I am in grief, or in a little time I shall be like one that is dead.——I must subdue my longing! Oh, divine beauty, dear to me as this life! Twice has her voice reached my ear, crying, husband, husband!—Oh let my fate like Ramas be, who lost and found his lovely bride; let Manan be restored to me!

SONG.

This spot must surely be like the region through which flow the seven celestial rivers;—dragons, galongs, and spirits must here abound, as well as devotees and hermits. Spices of all descriptions grow here—the trees are wedged together—and the crowds of aerial spirits who frequent the thickets, pass each other with the uniformity of machinery, without confusion, like the traditions which have been handed down to us, from remote times, upon tables of stone.

[*Arrives at the hermitage.*

Prince. Oh, meek recluse, who findeth pleasure in practising the duties of religion—master of this holy dwelling—pray tell me if you are happy and in health.

Hermit. Whence does my lord come, who fearlessly enters this enclosure armed with a flying spear?

Prince. I will tell you, holy man. The golden ear listened to the misrepresentations of a foolish astrologer concerning the queen of the royal heir, the mother of Moung Gyew, who is a lesser spirit; and as she was near losing her life, she abandoned her little son, and quitted the city of Pyentsa, which is the cause of my coming here armed with bow, spear, and sword.

Hermit. Hist, Hist! Do not follow her; do you think the road is easily traversed? the way is most frightful. Oh what a savage road it is, rocks, hills, and precipices; the air is stagnant; thorns and briers lie scattered in the path, and vast creepers entwine themselves (among the trees); and beasts of prey abound every where. Oh! do not go, my lord, for this is not all; what numbers of enemies you will meet with!—beyond the (dense jungle) about twelve miles, there are speckled monsters which lie (in wait) across the road to devour you; oh, do not go. Besides these there are other obstacles, there is a stream of copper, which burns to atoms; beyond this about twelve miles there is a frightful devil which will instantly devour you, for there will be no one to help you; if my habitation were near, the

monster would respect my presence—Oh, my lord, each step of the road is a great grandfather to the last passed over; do not go.

Prince. If I do not meet with Maydow of the silver mountain, though nine or ten worlds may have passed by, yet I shall not think of returning.

Hermit. My lord, as sure as that the castanets direct the measure of the song, so surely is your highness leaping into the mouth of the tiger.

Prince. If I do not meet with Maydow of the silver mountain, I would not think of returning, though hell itself were before me.

Hermit. There are other Dwaynanhas in the south island besides the one of the silver mountain, cannot you search for one here? Give me the magic bow which your highness carries, that good may come of the gift, and then depart on your journey back.

Prince. If your holiness requires the bow, take it.

Hermit. Astonishing! surprising! wonderful! To look at it, it is but an insignificant thing; but how heavy it is, and what strength it has!—I detained him because I thought he was one of the common order, but I now find he possesses many powers; so many indeed, that he may travel in safety wheresoever he chooses, either on the air or under the earth. Let me see if I can find the ring and the drugs which the benefactress Manan entrusted to me—I will go and look for them!——Ah! here they are—I bestow them upon your highness.

Prince. If your reverence's hair was more than three cubits in length, my obeisance would be still longer.

SONG.

[*The Prince arrives at the haunt of the devil.*

Prince. I will just sit down here, and take some betel leaf to refresh me.

Devil. My tribe have reigned in this Haywonta forest from the beginning—here have we held uninterrupted dominion, killed whatever we found, and eat it without cooking—our power, I fear, is about to be overturned. [*Sees the Prince,*] Oh, what is this? a mortal or a spirit? Didst thou arrive here by the road? You are my victim.

Prince. Listen! and I will tell you. I am neither a dragon nor a spirit, Pyentsa is my country; Thoodanoo my name; will you indeed eat me!—look at my sword, foolish devil!

Devil. Tush ! Tush ! Your sword is only a hand's breadth—you are unarmed—you are like the flimsy paper which is tough in the sunshine, but which falls to pieces in the rain.

Prince. Listen, devil ! Your pride is excessive ; if you do not retreat, you will be slain.

Devil. Attend, prince ! Whoever enters this forest of Haywonta, must acknowledge my power, and become my prey. [*Music.*

Devil. Oh, prince, make me your slave.

Prince. Forest king, are we not near the cane barrier and the copper stream ? conduct me past them.

SONG.

[*The devil conducts the prince.*

Devil. Oh, good prince, if anything happens to you, remember to call upon me for aid, I will now return to my post.

SONG.

Prince. The silver mountain towards which my face is now turned, is still distant ; my good genius is forsaking me, and my bad fate is leaving me a prisoner in this wilderness of dangers.

SONG.

The Prince arrives at a gigantic thorn tree, upon which are sitting two monstrous birds, with faces like mortals.

Female bird [*to her mate.*] We have satisfied our hunger to-day upon the flesh of lions, elephants, and deer ; what I wonder shall we find to-morrow ?

Male bird. Beautiful is thy speckled plumage ; to-morrow the princess of the silver mount will bathe and anoint her head. I smell the food preparing for the feast ; there will be more than I can devour—I will keep some in my pouch for you.

Prince. Oh, powerful birds which roost upon this immense thorn tree !—

Male Bird. Since I first alighted upon this tree, I have never heard the human voice. What art thou ?

Prince. Oh, mighty bird, listen, and I will tell—assist me to reach the silver mountain, and I will repay your favour.

Bird. Be not concerned, for I will give you the help you ask, young prince ;—neither horse nor elephant assisted you to make the

journey thus far—only your own perseverance; my mate is sick, but I will take you upon my back.

[*The Bird carries the Prince.*

Prince. Oh Bounmadee! thou mighty bird, alight under the shadow of these banyan trees, and leave me alone.

ACT.

SCENE 1st.—*City of the Silver Mountain.*

King. Millions of nobles, wearers of the golden chains of nobility, who follow behind me—my daughter Devay Manan having returned from the country of mortals, will bathe and anoint herself; appoint therefore 500 beautiful maids with budding breasts, to take each nine golden goblets, and go in procession to the east side of the city, to draw water for the ceremony.

Noble. My lord, we attend. Let Maensa be appointed directress of the procession. [*To Maensa*]. Go forth to the lake without the walls to the east of the city, and draw water for the approaching ceremony.

SCENE 2nd.—*Procession of Women.*

SONG.

Maensa. Ladies, under the shade of those banyan trees before us I see a young (Nat) spirit sitting, if he calls answer him not; she that transgresses shall pay a fine of five tecals.

Prince. Lovely palace damsels, if you have with you a little betel leaf, I entreat you to give me some.

One of the ladies. Do not be concerned, my lord, for betel leaf; if you desire it, I will give myself to you.

Prince. Oh deities, angels, and spirits! let this ring which I drop into the water reach the hand of my beautiful Manan!

[*He assists a maid to place the vessel of water upon her head and drops the ring into it.*]

SCENE 3rd.—*The Palace.*

Manan (while washing finds the ring.) Ladies, tell me if any thing happened at the lake, when the procession went out to draw water.

Maensa. Under the shade of the banyan trees which grow there we found a young spirit resting himself, and he assisted one of the maids to place the water vessel upon her head.

Manan. Oh my husband, come and take me!

The news of the young prince's arrival being communicated to the king, he is very angry that a mortal should presume to enter his country and lay claim to his daughter; he therefore orders that he be made to ride upon some wild horses and elephants, and the young prince acquitting himself surprisingly well in training them, the king promises to give him his daughter, if he can shoot an arrow from one of the bows of the palace. The prince shoots an arrow with ease and dexterity; but the king insists upon another trial—he obliges the prince to select the little finger of Manan from amongst those of her sisters, which are thrust to him through a screen; this also the prince does, by the assistance of the King of Nats.

Art. II.—*On the Bora Chung, or Ground Fish of Bootan.*

To the Secretaries to the Asiatic Society.

Gentlemen,—The following account of the *Bora Chung* or as it may be called, the Ground-Fish of Bootan, is so extraordinary, as to be worthy I think of the attention of the Asiatic Society, for so far as I know it is new. I am indebted for it to Mr. Russell, of Rungpore.

The Bora Chung is a thick cylindrical fish, with a body somewhat like a pike but thicker, with a snub nose, and grows from three pounds weight, to a length of two feet. The colour is olive green, with orange stripes; and the head speckled with crimson spots. It is eaten by the natives of Bootan, and said to be delicious.

The Bora Chung is found in Bootan, on the borders of the Chail Nuddee, which falls into the river Dhallah, a branch of which runs into the Teestah at Paharpore. It is not immediately on the brink of the water, however, that the fish is caught, but in perfectly dry places, in the middle of a grass jungle, sometimes as far as two miles from the river. The natives search this jungle till they find a hole, about four or five inches in diameter, and into it they insert a stick to guide their digging a well, which they do till they come to the water; a little cow-dung is then thrown into the water, when the fish rises to the surface. Mr. Russell has known them to be from six to nineteen feet deep in the earth.

Mr. Russell describes their other habits as not less curious. They are invariably found in pairs, two in each hole; never more nor less. He has not met with any less than three to four pounds; but as before said, they grow to the length of two feet. He has seen them go along the ground, with a serpentine motion, very fast, though the natives say they never voluntarily rise above the surface. In some

places they are very common, and live a long time when taken out of the water, by being sprinkled over occasionally with that fluid. One which Mr. Russell thinks to be the female, is always smaller, and not so bright in colour as the other.

I regret this account is so imperfect, especially as I have seen the fish, for when I was at Titalya, in March last, Mr. Russell very kindly sent me two of them. Unfortunately I was on the eve of starting with my family for the hills, and in the bustle of packing up, I had not time to examine them, intending on my arrival here to describe, and preserve the specimens for the Society. And still more unfortunately, I was unable to convey them up here, having been for want of carriage obliged to leave even many of the necessaries of life behind. Mr. Russell undertook to bring them with him; but one of them died and was thrown away in the plains, and the other made its escape from the vessel in which it was confined at Punkahbarry. He has promised to procure other specimens, so I hope soon to have the pleasure of sending some to the Society's Museum.

J. T. PEARSON.

DARJEELING, 10*th July*, 1839.

ART. III.—*Extracts from official records, with descriptive details regarding the new Nizamut Palace of Moorshedabad—erected by Colonel* D. M'LEOD, *Chief Engineer of Bengal.*

A superb model of the Moorshedabad Palace is now displayed in the apartments of the Asiatic Society, erected on a scale of half an inch to the foot; it forms an object of perhaps greater interest to the spectator, than would the noble edifice it represents. In the model we have all the details of the structure at once exposed and intelligible. To the amateur architect, as indeed to the general visitor, the documents we now publish, will doubtless prove an instructive and valuable lesson in classical architecture. We should not omit to mention, that every part of the model is of native workmanship, and of the most perfectly beautiful execution.—EDS.

To the Military Board.

Political Dept.

GENTLEMEN,—I am directed by the Honorable the Deputy Governor of Bengal, to transmit for your information and guidance, the accompanying copy of a correspondence with the Committee appointed to report on the Nizamut buildings at Moorshedabad.

2. In making this communication, the Deputy Governor has desired me to observe, with respect to the further works contemplated, the most important are, a new Imambarra, in substitution for the old one, stated to be in a ruinous condition; the removal of Meer Munglee's house, and the building of a new one; and, lastly, a Mudrisso or College. The cost of the whole of these, and of furniture for the Palace, is estimated for 3,60,000, of which 1,50,000 has already been sanctioned for the Imambarra and for the Nawaub's house.

4. His Honor the Deputy Governor, further desires me to take this opportunity of observing, that much praise is due to Colonel D. M'Leod, who has designed and executed this noble edifice, which will long remain a monument of the ability of its architect.

I have, &c.

FORT WILLIAM, *9th January*, 1839. *(Signed)* H. T. PRINSEP, *Sec. to the Govt. of Bengal.*

Extracts from the Report of the Special Committee of Inspection; dated 10th November, 1838.

We have the honor to submit, for the information of His Honor the Deputy Governor of Bengal, the result of our proceedings consequent upon the receipt of your letters of the 12th, 19th, ultimo, and without date, received at Moorshedabad, from the Governor General's Agent, in regard to the Nizamut buildings at Moorshedabad.

3. The new Palace is in length 425 feet, by 200 feet in breadth; and of one Order of architecture throughout the whole of its exterior, without any intermixture of the same on a reduced scale, or of any other Order. It stands on a slight elevation, produced by raising the foundation walls three feet above the general level of the ground, and filling up with earth to that height, in a gradual slope, to the extent permitted by the surrounding buildings, and the termination of the premises towards the river, on the banks of which the Palace stands—a conspicuous and imposing feature in the landscape from a great distance. The effect anticipated by raising the structure, as just described, has been fully accomplished.

4. The Order employed is the Grecian Doric. It is forty-six feet nine inches in height, having fluted columns thirty-six feet high; five feet six inches in diameter at the base, and four feet one and a half inches at the neck, with corresponding antæ, and an entablature of ten feet nine inches; the whole surmounting a basement of eighteen feet six inches, of which three feet six inches forms the plinth of the building. Over the entablature are parapet walls, varying in height according to circumstances, and ornamented with panels, plinths, and cornices. The pro-

jections of the cornice of the Order are of stone, having the guttæ and lilies in the angles cut out of the solid. Nothing could be more satisfactory than the execution of the whole detail of what this involves. The Doric Order is notoriously of difficult management, when applied to edifices of complicated design, from the necessity of observing the rules prescribed for the introduction of the triglyphs in the frieze of the entablature. In the present instance, with many projections and recesses, tending to create difficulties, there was not discoverable the slightest deviation from what these rules demand; the cornices and mouldings were noticed as being cleanly and sharply cut and defined, and all lines and surfaces, whether of stone or plaster, exhibited the most successful result of much labour and minute attention.

5. On the south front is a portico of eight columns, ninety-seven feet nine inches in length, surmounted by a pediment twelve feet high, and having a strong trussed roof of timber secured transversely by iron tie-rods. To the north, is the entrance portico of six columns, measuring seventy feet nine inches in length, with a corresponding trussed roof to the pediment, which rises ten feet; in the tympanum of either pediment are the arms of the Nuwaib Nazim, perfectly executed in relievo, and forming a very appropriate and effective finish to the whole.

6. Leading to the northern portico, is a noble flight of stone steps, commencing in its breadth above from the centre of the end columns, and having a platform stretching out in the same parallel to a width of twenty-four feet nine inches, from which, descending, it curves outwards on either side till it ends at its base, in a line extending to the length of 129 feet. There are two intermediate platforms, one of ten, and one of five feet in width; in a line with which last, at the extremities, are well proportioned pedestals with stone slabs, bearing inscriptions (the letters cleanly cut in relief) in English and Persian, exhibiting particulars connected with the erection of the edifice, (see enclosure No. 1,) and in front of these pedestals, on blocks carried out from their bases, corresponding in height and breadth with the last flight of steps, and ten feet six inches in length, are placed two sphinxes, admirably executed, both as regards the design and workmanship. They are of solid teak, but painted and sanded so as exactly to resemble stone, and form highly ornamental appendages to the entrance in the position they occupy. Iron railing, of a graceful pattern, corresponding with that of the colonnades (rising from which are five lamp-posts on either side, with three on either pedestal below) surmounts the flight at either extremity. Underneath, is a capacious carriage way; and there are three vaulted ranges, two of them open,

and one (the lowest) closed in, and forming *ábdarkhánesh* and other useful offices.

7. To the north front are two smaller porticoes (to the wings) of four columns each, and intermediately between the centre and wings on either front, receding colonnades; which also form leading features of the end fronts of the building.

8. To all the above colonnades, including the porticoes, are continuous balconies to the third floor, four and a half feet wide, of light appearance but of great strength, being constructed of iron beams or cantilevers from nineteen to twenty-one inches apart, inserted in the walls between stones to a depth of one and a half foot, and supported on brackets at intervals, the rest of the material of the floor being of flat bar iron. The floor is composed of tiles, terras, and marble, confined by a plate or band of iron. The railing is partly of iron and partly of teak; the main supports and some of the rails being of the former, upheld by brackets branching from the cantilevers.

9. The spaces over the doors and windows within the colonnades, as well as those of the treble windows in the exterior walls, are relieved by panels, in which are inserted ornaments of various descriptions, in relief of good design, and extremely well executed.

10. There are two open courts in the interior of the building, seventy-two by fifty-two feet, finished in every respect in the same style as the exterior, having substantial drains all round, communicating with large covered ones externally, which are carried to a considerable distance, and empty themselves into the river.

11. Round the exterior of the building there is a platform of the finest masonry, bricken-edge, seven feet wide, from which spring small flights of stone steps to the height of the plinth, leading to the entrances in the several compartments of the edifice; outside of which is a roadway or walk, of corresponding breadth, composed of *koah* nine inches in depth. The plinth of the building has oval flue openings of twenty-two by eighteen inches, furnished with strong iron gratings;—where flights of steps interfere, three of the step-facings in each have gratings, of eighteen inches in length, fixed into them.

12. The interior comprises a basement floor, from thirteen feet to thirteen feet three inches in height to the beams; a principal floor, from twenty-one feet nine inches to twenty-two feet in height, to the ceilings; and a third floor of the same height as the latter.

13. The principal entrance is from the north portico into a vestibule thirty-six feet by twenty-seven feet, having a geometrical stone staircase at either side, seven feet six in width, with iron railing and

mahogany hand-rail, each staircase receiving light from four painted glazed windows.

14. Within this range is a corridor or passage, twelve feet wide; leading to the wings of the edifice, divided into compartments, and so contrived, that by shutting two doors the communication with the wings is cut off, without any interruption to that between the other portions of the building.

15. From the centre of the corridor a large door opens into a circular room fifty feet in diameter; to the right and left of which (on entering) is a room fifty-two feet by twenty-five feet; the three comprising one suite of apartments, separated from the wings by the open courts, (noticed in paragraph 10.) The circular room is of the Corinthian Order, taken from the temple of Jupiter Stator at Rome. The Order is in height thirty feet six inches, with pedestals of four feet six inches. From the entablature, on a line with the frieze, springs a cupola of masonry, with sunk panels, ending in a painted glazed skylight twenty feet in diameter, the height from the floor to the opening of the skylight being fifty-six feet, and to its apex sixty-two feet. The room is decorated in its circumference by four large covered recesses, over which are long panels, eight pilasters, and four large doors; over which last are oval openings occupied with pierced screens of arabesque, cut in single slabs of stone. All the mouldings and compartments are richly carved and ornamented, in conformity with the rules of the Order of which the apartment is composed; and, whether as regards the effect of the whole, or the exquisite finish of the details throughout, it is impossible to speak too highly of what has been accomplished. There is nothing to add and nothing to alter: the architect and builder have done their work perfectly.

16. To the south of the above suite, is a grand colonnaded saloon, measuring one hundred and eighty-seven feet six inches in length, susceptible of division at pleasure into three apartments, by means of sliding doors, eighteen feet two inches wide, the leaves sliding into cases, faced on both sides, from the bottom to the top, with mirrors. The general width of this saloon is fifty-five feet, the centre space within the bases of the columns being twenty-five feet. Beyond either extremity of the saloon is a geometrical stone staircase, five feet three inches wide, with railing, as before described, communicating with the apartments of the wings.

17. The wings do not correspond internally with each other: both are divided into apartments of various suitable dimensions, each having a spiral stone staircase at either corner, with baths, dressing rooms, &c.

18. With exception to the circular room (of paragraph 15) the interior of the whole of the principal floor is of the Roman Doric Order.

19. On the third floor the dimensions of the several apartments necessarily correspond with those immediately below, just described, excluding the circular room, which comprehends both floors. In this third floor also is the same arrangement of the saloon as that described for the principal floor, but the Order throughout is the Antique Ionic, nineteen feet high with fluted columns, pilasters, &c. surmounted by a coved ceiling rising two feet nine inches.

20. The whole of the apartments in both these floors are ceiled with canvas, or teak wood frames, through which are fitted into the beams strong brass hinge-hooks for punkahs, and brass for lamps or lustres, to an extent ample for every purpose of use or ornament.

21. In both floors the doors are painted in imitation of different woods (Satin wood, Mahogany, Oak, Maple, &c.) and highly varnished; and, with a few exceptions (in the minor apartments of the wings) they are fitted with plated locks, bolts, and hinges, and hand-guards; also on the principal floor.

22. All the apartments in the wings of both floors are coloured in distemper, in light tints of various colours; and the walls, as high as the surbase of the vestibule, and four staircases are painted in imitation of marble; all with very good effect. There are twelve fire-places, with carved mantel pieces of teak, also painted and varnished in successful imitation of rare marbles.

23. The floors of the whole of the public apartments of the principal story, including the vestibule and landing places of the great staircases, are paved with polished marble; and those of the corresponding apartments in the third story, with the landing places of all the four staircases, are laid with teak boarding.

24. The whole of the public rooms in both floors, and the columns in the wings, are finished with polished stucco, in imitation of the Madras chunam; and it may here be observed, that the flutings and finishings of all the columns, exterior and interior, are remarkably well defined, and evenly and sharply wrought; a completion very rare, where brick and plaster are the materials, in houses even of the highest pretensions in this country.

25. The basement floor is finished in a plain style, having a simple moulded band under the beams and no ceilings. The doors and windows are of appropriate substantial construction, fitted with brass locks, bolts, and hinges, and painted plainly. Under the circular room (of paragraph 15) are four strong lock-up closets for treasure, plate, jewels, or other articles of value, with a large open space for a guard.

In the arches of the treble windows of this floor, fifteen in number, are coloured fan-lights.

26. In the west wing is a steam-bath, complete in all respects, executed subsequently to the erection of the building, as we were informed by Colonel M'Leod, at the particular desire of the Nuwaib Nazim.

27. All the exterior colonnades and porticoes in the basement and principal floor, as well as the vestibule and staircases of the basement, are paved with stone.

28. Koah roads, twenty feet wide, have been constructed, and well rolled, in all that portion of the ground about the Palace which has yet been cleared of old buildings: the banks of the river have been sloped off and sodded throughout the whole extent (with the exception to a very small portion, for which it seems earth was not procurable) and stone posts have been inserted along the top, as fastenings for boats. The whole of the ground (cleared) has been smoothed and grassed, and completely drained.

29. At a short distance, in front of the Palace, is a handsome sun-dial, five feet in diameter, a surplus stone so converted by Lieut. Cunningham; it rests on a pillar based on stone steps, and forms a useful and appropriate appendage to the premises.

30. A substantial stone ghat, fifteen feet wide, has been constructed near the Palace for the convenience of the Nuwaib, and at about 800 yards to the south of the Palace a large *Noubulkahneh* gateway has been erected, as an entrance to the grounds in that direction. As it was not immediately in view, there did not appear to be any objection to its being built in a style of architecture adapted to its purpose, and the Asiatic or Turkish has been adopted.

32. In concluding this head of our report, it seems proper to advert to the fact of this edifice, in all its departments, having been constructed and completed by natives of the country; the only exceptions to which remark are in regard to the painting and glazing, which portions of the work were executed by professional Europeans. The expressions of approval which will have been found interspersed with the preceding details, were elicited by particular features of the building under review, inviting a more peculiar attention from their importance, or the effect produced by them on the eye of the observer; but they are equally applicable to every part of the structure, which whether considered as a work of art to be admired for its exceeding beauty, or as an example of skilful labor applied to the practical combination of excellent materials, reflects the highest credit on the architect and all

subordinate to him, concerned in its erection. The late rainy season was one of uncommon violence, and had just closed when our survey was made, and the soil far and wide was either inundated or saturated with moisture. Nothing could have more searchingly tested the strength and solidity of a newly erected edifice; but not a crack or symptom of yielding was to be seen, externally or within, throughout the whole extent of this fabric; and we conclude our remarks upon it with the expression of a grateful anticipation, that a lengthened durability awaits what we have represented as so pre-eminently worthy of a lasting preservation.

In conclusion, we would here recapitulate, in a few words, the opinion to which our inquiries have led regarding the three points to which reference is made in the second paragraph of our report.

As to the execution of the works, our verdict after a careful examination of all that presented itself to our view, is one of unqualified approval and commendation.

A plan of the premises with which the architect has kindly furnished the Committee, is appended; and will render intelligible at a glance the relative sites of the different buildings forming the subject of this report.

We have, &c.

(*Signed*) R. H. RATTRAY,
" W. CRACROFT,
" HENRY DEBUDE,
" W. R. FITZGERALD.

CALCUTTA,
10*th Nov.*, 1838.

ART. IV.—*Researches on the Gale and Hurricane in the Bay of Bengal on the 3rd, 4th, and 5th of June*, 1839; *being a first Memoir with reference to the Theory of the Law of Storms in India. By* HENRY PIDDINGTON.

PART I.

The notices of Colonel Reid's Book on the Law of Storms, which appeared in the Calcutta papers and Edinburgh Review, had much excited my attention; for the subject was, to me, one connected with many associations of early life, and more especially with one instance in which to the veering of a hurricane alone I owed my safety from shipwreck, after cutting away the mainmast of a vessel which I commanded.

Hence, having some leisure when the tempest of the 2nd to the 6th of June, 1839, occurred off the Sand Heads, I was induced to undertake the investigation of its different phænomena, with a view to see how far they would accord with the theory of the Law of Storms.

The sources from which I had to obtain my information were the logs of fourteen vessels which arrived at Calcutta, having felt the effects of the gale or of the hurricane; the reports of the Pilot and Light vessels, kindly furnished to me, with the permission of Captain Harrington, by my worthy friend Captain Clapperton of the Bankshall; and accounts obtained from Balasore, Poree (Juggernaut), Masulipatam, and other places, in all about thirty different authorities.

These sources form the amount of what was available here; but, that the inquiry might be as complete as possible, I addressed the following letter to the President of the Calcutta Chamber of Commerce.

To R. H. COCKERELL, ESQ.

President of the Calcutta Chamber of Commerce.

'SIR,—I beg to state that I have undertaken the investigation of the course and effects of the gale of the 3rd, 4th, and 5th instant, with reference to the theory of Colonel Reid on the Law of Storms.

'I have applied, personally or by letter, to most of the captains or consignees of the inward-bound vessels which were exposed to it; and with the permission of Captain Harrington, and kind assistance of Captain Clapperton, shall obtain from the Bankshall reports from the H. C. Pilot and Light vessels. My chart is already drawn, and I am only waiting for the logs and reports.

'So far, I trust, we shall be able to embody all the information which can be obtained here, and perhaps furnish a valuable supplement to Col. Reid's book; but it is evident that our work will not be complete without the statements to be obtained from the logs of the homeward-bound ships from hence; which, having stood to the south-eastward on leaving their pilots, were more towards the middle of the Bay than the inward-bound ones, whose track is toward Point Palmiras.

'It is therefore my intention to print the information obtained here, with a lithographed chart, and to forward it to the President of the East India and China Association, by whom it will be forwarded to Col. Reid if in London, or if absent to Mr. Babbage; to whom I am, by the kind assistance of Sir Edward Ryan, allowed to refer; and who will take up the completion of the investigation, or refer it to competent hands.

'But it has occurred to me that less attention might be paid to the application of an individual than to that of a public body; and I therefore take the liberty of addressing you, Sir, as President of the Chamber of Commerce, to request that it will be pleased to direct its Secretary to write to the Chambers of Bristol and Liverpool, the East India and China Association, and the owners and commanders of the vessels in the accompanying list, praying from them their

exertions in collecting and transmitting the required information to the President of the East India and China Association. I add a draft of a letter which states what are the points on which it is desired.

'It is unnecessary for me to add that, to a naval and a commercial nation, the value and importance of a correct knowledge of the laws by which storms are governed is such, that, in the words of Sir John Herschell 'it cannot be overrated;' and this I doubt not will excuse my intruding upon you and the Chamber for your kind assistance.

'I am Sir,

'Your obedient servant,

'H. PIDDINGTON.'

CALCUTTA,
June 25th, 1839.

List of Homeward-bound vessels from Calcutta, the logs of which it is desirable to obtain for the investigation at home.

Vessels' Names.	*Commanding.*	*Left the Pilot.*
Ship Marian, ...	T. Henry, ..	22nd May, 1839.
Barque Cape Packet, ..	C. Lamb. ..	22nd ,,
F. Ship Emma, ...	J. A. Bonamour,	
Barque Bengal, ...	J. Marjoram, ..	23rd ,,
Ship Mobile, ...	D. Ogilvy, ..	23rd ,,
Barque Lloyds, ...	E. Garrett, ..	24th ,,
Barque Renown, ...	D. M'Lean, ..	24th ,,
Ship Gloucester, ..	S. E. Crook, ..	24th ,,
Barque Gentoo, ...	H. Dodds, ..	26th ,,
Ship William Nicol, ..	J. Potter, ...	26th ,,
Barque Augustus, ..	A. J. Gordon, ..	27th ,,
Barque Elizabeth, ..	J. Deivar, ..	29th ,,
Barque Clydesdale, ..	C. Davis, ...	29th ,,
F. Barque Appollon, ..	Langlois, ..	31st ,,
Brig City of Aberdeen,	J. Monro, ..	31st ,,
Ship Frances, ...	J. J. Johnson, ..	2nd June, 1839.

DRAFT OF A LETTER TO COMMANDERS AND OWNERS.

SIR,—I am directed by the Chamber of Calcutta to state that Mr. Piddington, of this city, has undertaken the investigation of the course and effects of the gale experienced in the Bay of Bengal between the 2nd and 6th June, 1839, with reference to Colonel Reid's theory of the Law of Storms. The immense importance of this subject to commerce and navigation it is not necessary to point out. All the information collected here will be printed and sent home with a litho-

graphed chart, but it is evident that the inquiry can only be completed by having the tracks and weather experienced by the ships homeward-bound from hence also laid down upon the chart; and I have therefore to request that as of the ship you will be pleased to forward, free of expense, the information requested below to A. H. De Larpent, Esq., President of the East India and China Association, by whom it will be placed in the hands of Colonel Reid, or, in his absence of Mr. Babbage, to complete the investigation begun here.

The information desired, is—

1. Copy of the ship's log from the Pilot to 15° north latitude, with any information obtainable from the journals of the captain, officers, or passengers.

2. Notes of the heights of Barometer, Thermometer, and Simpiesometer; these are very desirable.

3. Peculiar appearance and states of the weather as to clearness, heavy dark clouds, &c., as noted at the time, or from recollection.

4. Electrical or other phænomena, as remarkable lightning, waterspouts, &c. and generally the most detailed information which can be afforded, particularly from the 2nd to the 6th June, 1839. The more details the better.

Your's, &c.,

———.

Secy. Calcutta Chamber of Commerce.

To H. PIDDINGTON, ESQ.

SIR,—I am directed by the Chamber of Commerce to acknowledge the receipt of your letter of 27th ultimo, explaining how you are engaged in tracing the course and effects of the late gale in the Bay of Bengal, to ascertain how far the phænomena observed will support the theory recently promulgated as to the Law of Storms. And I have to inform you, that the Chamber will be happy to address the East India and China Association of London, and the Chambers of Commerce of Liverpool and Bristol, to obtain the particulars required from the homeward ships to complete the interesting investigation which you have undertaken.

I am, Sir,
Your most obedient servant,
W. LIMOND, *Secretary.*

BENGAL CHAMBER OF COMMERCE,
July 1st, 1839.

There was no other nautical source from which information could be obtained. I made a public request, in the newspapers, for the heights of barometers at noon from the captains who had obliged me with their logs, so as to compare these with the register kept at the Surveyor General's Office, and obtain thereby, as nearly as possible, the correct barometrical state of the atmosphere during the gale; for it was evident that, if one barometer had an error above, and another below the truth, their difference would appear much greater than it really was. In only one or two instances was this request attended to.

As stated above, I found on the part of every public officer, as well as on that of the merchants and agents whom I addressed, the greatest readiness to assist me, and this was also the case with the majority of the captains of ships; some of whom seemed to take a pleasure in affording all the information they could furnish, accompanying their logs with detailed notes; but a few were sadly churlish, and had to be written to or called upon three or four times, before they could be persuaded to take the trouble of furnishing me with the extract of the four or five days' logs, which was all that was required;* and others, still more provokingly, having given me a valuable extract, paid no attention to my repeated applications for further information on points which would evidently have been of the greatest interest. I abstain from mentioning names. But in one instance I called and wrote *seven* different times, to obtain further notes, or a sight of the ship's log book, and without success! The subject was new to some, and they were not aware of its importance. "I don't think they will make much of it" was the remark of more than one; until what *had* been "made" of it was explained to them. Unfortunately indisposition prevented me latterly from going on board of the few vessels which have thus escaped me. There is, it is true, some excuse for men so hurried and vexed as commanders of ships, having to discharge and re-load in Calcutta, often are; but I trust on a future occasion that, as I shall elsewhere suggest, authority will be given to the Master Attendant to compel the fulfilment of this public duty; so exceedingly trifling in itself from each individual, and yet so deeply important to the community at large, and indeed to the very individuals from whom it is required, did they rightly understand their own interests.

It will be necessary first to place upon record the materials, before proceeding to the deductions they afford; but to do this within a more

* The answer to my second or third chit in one instance is worth inserting.

Calcutta.

"Mr. Piddington,

"Sir,—I received your note, but I have not time to attend to such trifles. But if you call on board the ship, in all probability the Mate will allow you to see it." ——

convenient compass, and to the landsman in a more readable shape, I have, when the captains of vessels themselves have not given me a summary, made one from the logs, comprising all that is essential to our purpose. The seaman will, I hope, be satisfied when I say that I have commanded a vessel, and have therefore I trust omitted nothing of consequence. The logs themselves will be sent to Europe for the use of Mr. Babbage or Col. Reid.

No. 1.—*In Calcutta.*

The Meteorological registers from the Surveyor General's Office—the notes on the weather I have added as it appeared within the town.

1839.	Bar. at Noon.	Ther.	Winds.
June 1st	29,536	92·7	NE. Cumuli, Squalls from the NE. with rain.
2	,, 475	90·8	EbS. Cum. Strong squalls and rain.
3	,, 428	89·10	..... Fresh gales with squalls.
4	,, 400	86·7	EbN. ..... A gale with very severe squalls & rain.
5	No Registers.		ESE. ..... Strong squalls veering to SEd.

No. 2.—*Diamond Harbour. Latitude* 22° 11′.

On the 1st June, Light variable airs. 2nd, Variable, cloudy, and frequent rain. 3rd, NE. breezes and rain. 4th, Strong NNE. breezes and frequent rain. 5th, Strong gales and squally East to SSE. and heavy rain. 6th, Wind at SSE. and cloudy. Thermometer from 1st to 6th 83° to 85°.

No. 3.—*Kedgeree. Latitude* 21° 52′ *north.*

June 1st.—Light variable Easterly winds, cloudy, and rain, thunder, and lightning. 2nd, Cloudy, N. Easterly squalls and rain with calms, heavy rain, thunder and lightning. 3rd, Heavy squalls from North to East and rain, very unsettled appearance. 4th, Heavy Easterly squalls and rain, unsettled weather. 5th, Smart gale from SE. to E. and rain. 6th, Strong breezes, SE. to S. and cloudy.

No. 4.—Hon'ble Company's Upper Light Vessel "Hope," A. C. Hudson, in Latitude 21° 26′ north.

1st June, Civil Time.—Winds light and variable all round, with some rain. 2nd, Light winds during the first part; at noon heavy squalls from the East, with rain and thunder; latter squally, with wind from the Northward at times. 3rd, First part variable and squally from E. to N.; in the morning, wind increasing from NE. with heavy squalls; noon wind ESE. inclining to a gale; at sunset gale from E., and during the night from ENE. with heavy sea; vessel riding with 160 fathoms cable. 4th, Gale continuing in heavy gusts from Eastward and shipping seas fore and aft. Till noon the same weather, but wind at ESE.; at 8 P. M. gale veering to SE. with dull gloomy weather, and at midnight gale at SSE. 5th, To day-light gale blowing very hard at SSE. veering latterly to S. in heavy squalls, with dismal weather and a heavy sea on; vessel shipping water fore and aft; at noon gale decreasing, with rain at sunset. Toward midnight strong breezes at S. with very heavy sea.

I shall in another part of this paper refer to the very instructive barometrical observations annexed to this log, which are highly creditable to Mr. Hudson's attention.

No. 5.—Hon'ble Company's Lower Light Vessel "Beacon," Latitude 21° Longitude 88° 27′—J. Davenport, Commander.

1st June, Civil Time.—A. M. light winds E. to NE. with heavy clouds to the SW., middle and latter parts moderate breezes, NE. to ENE. cloudy, unsettled weather and a heavy swell.

2nd.—Mostly moderate ENE. breezes, with cloudy unsettled weather, and a heavy sea rising; at midnight blowing strong; heavy squalls from ENE. with rain, thunder and lightning.

3rd.—Wind mostly from ENE. veering latterly to E. in the squalls. A. M. blowing hard, and increasing latterly to a gale, with a heavy sea; vessel shipping water fore and aft. *4th*, Gale veering from ENE. to E. and ESE. with severe squalls and a heavy sea; every appearance of a heavy gale; middle and latter parts blowing a gale SSE. to ESE. with heavy squalls of wind and rain; a heavy sea, and dark, dismal, threatening appearance all round. Kept the whole of the crew on deck during the night; riding with 200 fathoms of cable. *5th*, Gale moderating, but still blowing heavy and in hard squalls from SSE. to SE. with a heavy sea; latterly wind from SSE. to S. blowing hard and in squalls, with dark passing clouds and heavy sea;

vessel rolling and pitching very much, riding with 200 fathoms of cable. 6th, Strong southerly breezes and squally.

---

*No. 6.—H. C. Pilot Vessel "Jane."**

1*st June*, 1839. *Civil Time.*—On the cruising station off Point Palmiras, winds light and variable, cloudy to the North and Eastward. 2d June, Throughout fresh breezes and squalls with rain from the Northward, and threatening appearance to the Eastward, anchored near the Floating Light Beacon. A strong current to the Westward. 3rd June, Throughout strong gales with rain and very threatening appearance to the NE. 4 A. M. Fresh gales from NE. Noon, gale increasing; riding with 170 fathoms cable. 4th June, Throughout hard gales E. to ESE. with heavy rain and threatening appearance all round; noon, blowing hard from E. to ESE. wind SE. in squalls with heavy rain and threatening appearance. Vessel driving, let go a second anchor. 5th, Strong gales from SE. to S. heavy rain and threatening weather, latterly squally from SSE. to S. 6th, Moderate breezes from South.

No. 7.—H. C. Cruizer "Amherst," J. Paterson, Esq. Commander.

Memorandum of the state of the winds and weather from the 29th May to the 6th of June at the head of the Bay of Bengal, as experienced on board the H. C. Ship "Amherst" on her voyage from Arracan to Calcutta, 1839.

29*th*. Started from Akyab at day-light with freshening breezes from E. to NE. and rain at intervals; the mountains covered half way down with thick white clouds; at sunset weather much clearer, the sea smooth, the wind decreasing, throughout the night very fine.

30*th*. The weather become perfectly clear, without rain; the same appearance in every direction; horizon interspersed with very light still clouds, light Easterly airs and calms, sea smooth, the ship going from one to three knots per hour; at 8 P. M. sharp flashes of lightning to the ENE.; the night continued fine and very clear, little variation in the wind. Long. 90° E. lat. 20° 39′.

31*st*. Day-light sharp lightning to the Eastward, wind increasing from that quarter; the weather began to settle down for rain at noon, variable sharp squalls from SE. to NE. with a good deal of rain,

* The European reader, into whose hands this may fall, requires perhaps to be told that the Honorable Company's Pilot vessels, at the mouth of the Hooghly, are not Pilot-*boats*, but fine stout Bombay-built Brigs of 250 tons, perfectly well manned and provided in all respects, and officered by able seamen duly educated to their profession.

thunder and lightning to the Eastward; sunset, the wind steady from the Eastward, with smooth sea, occasional showers during the night, lightning very vivid to the Eastward, sometimes sharp flashes of lightning to the South.

1st June. The weather very similar to yesterday, more sea, very sharp lightning during the night to the NE.; 8 P. M. Outer Light Vessel bearing NNE. about nine miles distant.

2nd. Heavy squalls from NE. to NNE. during the early part of the morning; 10 A. M. wind steady from ENE. weather more hazy and sea rising; 4 P. M. wind NE. by E., sharp lightning to the ENE.; sunset, Outer Light Vessel SE. by E. six miles; 8 P. M. Light Vessel E. by N.; heavy squalls from the NE. with sharp rain, ship under double reefed topsails, the weather threatening throughout the night.

3rd. Day-light heavy squalls from the ENE. ship under double reefed topsails, sea rising fast with rain; noon, off the tail of the Eastern Sea Reef; gale increasing from ENE., ship standing out under three reefs in the topsails, top gallant yards on deck; at 8 P. M. split the topsails, reefed the courses, the wind steady from ENE., heavy sea and the gale still increasing with rain, no lightning up to midnight.

4th. 2 A. M. ship reduced to main courses, wind ENE. heavy gusts of winds and rain; 4 A. M. a hard gale at ENE. ship labouring much; 6 A. M. gale still increasing; at 11 A. M. ship under bare poles, wind ENE.; 3 P. M. wind E.; 3° 30′ P. M. wind ESE.; 4 P. M. wind SSE.; blowing a perfect hurricane; 6 P. M. wind South, a tremendous cross sea; ship at this time off "Codgone Point," up to midnight blowing a perfect hurricane from South to SSW. no lightning nor thunder.

5th June. 2 A. M. gale began to moderate from SSW. with heavy cross sea; noon, longitude 87° E. latitude 20° 3′ N.; ship throughout the remainder of the day under foresail and close reefed main topsail with dry weather but very hazy, the sea very high.

6th. The wind steady from SSW. and hazy.

Remarks.—The 30th May led me to be very watchful of the weather, it became so extremely clear and such a sameness in the appearance all round; the stars very bright, the clouds stationary and of a very light appearance, the lightning very very sharp, the noise of every thing on board seemed to be more than ordinary. What was most remarkable, the wind continued so steady from the Eastward at one time on the 4th that I had most serious apprehensions of the ship drifting on shore upon the western shores of the Bay; the wind shifted suddenly, otherwise nothing but her anchors could have saved her.

J. PATERSON, *H. C. Ship "Amherst."*

No. 8.—H. C. Pilot Vessel "Krishna," Mr. J. Crook, Branch Pilot, Commander,—at the Cruising Station.

2nd June, 1839. *Civil time.*—NE. to E. squall and threatening to the Eastward. 3rd June A. M. freshening fast NNE. to NNW. with dirty weather; noon fresh gale NNW. to NNE. at. 20° 10′; weather threatening stood off the land. 4th Wind N. by E. at noon hard squalls and rain; gale increasing to 8 P. M. Midnight wind N. and gale apparently breaking. 5th A. M. Threatening again, and an increasing gale NNE. to NNW. till noon. P. M. hard gale, hove too under main topsail and fore topmast staysail, at 8 under bare poles; a man washed overboard but saved. Wind from N. to W. and SW. 1 P. M. *a dead calm!* with a high cross sea rising perpendicular, caused by a heavy roll coming up from the SW. against the northerly one; vessel labouring very much; at 1° 30′ P. M. wind suddenly veered round to the SW. and blew a furious gale with severe squalls and heavy rain till night. 6th A. M. gale moderating. At noon clearing up. Wind WbS.

No. 9.—2nd June, 1839.

Brig "*Sarah*" from Rangoon stood in on the evening and took a pilot on board, but the weather being suspicious stood out to seaward.

3rd June. Throughout the night hard squalls ENE. and rain. At day-light every appearance of an approaching gale, high sea, and hard squalls; noon, lat. 20° 30′ N. in 46 fathoms (about long. 88° 02′ E.) Strong gales ENE. and high sea; at midnight hard gale about E.; vessel struck by a sea abaft, and jolly boat carried away.

4th June A. M. constant hard squalls and gale about ESE. till noon; P. M. more moderate; at 2 P. M. wind veered to the Southward with rain; at 4 P. M. increasing gale, furled all sail, hove too under bare poles; at 9 P. M. Bar. 28° 88′; and to midnight hard gales veering round. Barometer 28° 56′.

5th June. Day-light moderating; towards noon fresh gales SSW. and clear with high sea. Lat. 19° 42′ N.

No. 10.—Honorable Company's Pilot Vessel "Saugor," Mr. J. Cearns, Branch Pilot, Commander.

2nd June, Civil time.—At anchor in nineteen fathoms, off Point Palmiras bearing about NWbW. 1 P. M. a squall from the Eastward; till midnight pleasant.

3rd June.—A. M. squalls from NE. and ENE.; at noon strong breezes and a heavy swell from SE., but wind N.; gale freshening, and at midnight from NE.

4th June.—Increasing fast from NE.; at noon NE.; 8 P. M. ENE. a hard gale at E. and heavy sea at midnight.

5th June. 4—A. M. wind E.; noon ESE.; hard gale veering to SE. and SSE.; moderating at midnight. On *6th June* A. M. wind South.

No. 11.—*Pooree, or Juggernaut Pagoda,* 19° 48′ *N.*, 85° 45′ *E.*

Letter from Dr. Cumberland, Surgeon of the Station, who after regretting that he can give but imperfect information, says,—

"The *2nd of June* was very cloudy; about 11 A. M. we had a heavy squall from the E. afterwards a succession of others, from almost every point of the compass. At night it was blowing hard from the NE.; and on the *3rd,* we had a hard gale from the N. with heavy clouds and rain. *On the 4th,* still blowing a hard gale from the N. with heavy clouds and incessant rain; at 5 P. M. the wind shifted suddenly to the W. and gradually veered round to the SW. after which it moderated, still however blowing a gale. *On the 5th,* the gale continued from the SW. very cloudy but no rain. *On the 6th and 7th,* fresh breezes from SW. with very cloudy weather. *On the 8th,* light winds. The quantity of rain which fell on the 2nd of June was 1 inch; on the 3rd, 2 inches and 1-10th; on the 4th, 4 inches and 9-10ths.

POOREE, *6th July,* 1839.

No. 12—*Letter from Captain Hookey of the ship "Mary Somerville," 15th June,* 1839, *accompanying his log.*

I have much pleasure in communicating any information in my power respecting the gales in the Bay of Bengal on the 3rd, 4th, and 5th June, in which the "Mary Somerville," and several other vessels happened to be. Although the gale with us appears to have been of short duration, it was very severe. We experienced ever since crossing the equator, (which we did on the 20th May) hot sultry weather, with variable winds from N. to W. chiefly. On the 3rd June, at noon, latitude 19° N. longitude 85° 29′, wind very unsteady, both in strength and duration, with heavy squalls chiefly from NW.; occasional heavy rain. Ther. 86°, Bar. 29° 25′, Simp. 29° 40′.

4th June.—Fresh gales from W. with heavy rain; at noon Ganjam NWbW. twelve miles. Ther. 86°, Bar. 29° 15′, Simp. 29° 30′. It continued to blow a fresh gale but not a severe one, wind from W. to WSW.; at this time a heavy sea from SE., ship lurching very much.

5th June.—Strong breezes; ship under double reefed topsails, wind SW.; at noon Juggernaut Pagoda NE½E. eighteen miles; at 5° 30′ P. M. the Black Pagoda bore NWbW½W. fifteen or sixteen miles; wind now increasing to a severe gale at S.; hove the ship too under easy sail; head from ESE. to EbN. but the wind drew gradually round to the SW.; the sea continued at SE. and the ship laboured most tremendously; at midnight it began to moderate, and blew a fresh breeze from SW. which carried us to Point Palmiras by 5 o'clock P. M. on 6th June. When the severe part of the gale commenced at 5° 30′ P. M. 5th June, the Black Pagoda bore NWbW½W. sixteen miles; the Ther. was 86°, Bar. 29° 10′, Simp. 29° 25′; the lowest we had it; and it began to rise at 10 A. M., Simp. first, then Bar. about an hour after. We must have escaped a great part of the gale as the SE. sea was very high, but we never had the wind from that quarter; the severe part with us was from SSW.

Captain Hookey says in another letter to me—the reason of our laying too so much was not caused by stress of weather, but from our having carried away our fore topmast, and fore and main topgallant masts in a severe squall from the NE. on the 2nd in the afternoon; I therefore laid too till the ship was again prepared to run for the Sand Heads ————.

No. 13.—Ship "Justina," Extract from her log forwarded by Capt. T. H. Bentley.

3rd June, 1839.—*Nautical time.*—Monday night at 2 A. M. squally; in royals and flying jib (ship's head NEbE. wind NNW.) in fore and mizen topgallant sails. At 5 A. M. heavy appearance to the N. reefed the driver, sent down royal yards.

At 8 A. M., ship's head NE. wind NNW., gale increasing; in 2nd reef of the topsails; at 9 A. M. heavy squalls with heavy rain; up mainsail; at 10 gale increasing, up foresail, in mizen topsail; heavy squalls with rain; at noon ship's head ENE. wind N., furled mainsail, wore ship. Lat. Obs. 19° 14′ N.

Tuesday, 4th June. Wore ship to the westward; at 1 P. M. ship's head WSW. wind NW. strong breezes and squally, close reefed the fore topsail, furled the fore sail; at 3 P. M. gale increasing, in 3rd reef of the main topsail, in driver; at 5 P. M. ship's head SWbW. wind NW. heavy cross sea running, ship pitching heavy; at 6 gale increasing fast with heavy squalls and constant rain.

At 7 ship's head SW½W. wind NW.; at 9 ship's head SWbW. pitched bowsprit under, carried away the jib boom, fore topgallant

mast and main royal mast; cut away the jib and flying jibboom; made the fore topgallant mast fast to the topmast rigging; at 11 hard squalls with a high sea running. At midnight ship's head SWbS. wind NW. At 2 A. M. severe gale, with a tremendous sea running; at 3 ship's head SW. wind WbN. the fore topmast staysail blew to atoms, ship lying with the lee bulwarks under water; at 4 heavy gales with severe squalls and constant heavy rain; at 8 bent another fore topmast staysail; at 9 A. M. ship's head SbE. wind WSW.) at noon hard and severe gales, the fore yard arm at times in the water.

Wednesday, 5th June. At 1 P. M. ship's head south; wind WSW. at 3 a heavy sea filled the quarter boat, the fore davit gave way, let the boat in the water, cut away the after fall the boat being stove; a heavy sea with severe squalls; at 5 P. M. ship's head SbE. wind SWbW. more moderate; at 6 wore ship to the NW.; at 7 set fore trysail; at 8 ship's head WNW.; wind SWbS.; at 11 more moderate, set the foresail; at 1 A. M. ship's head NW., wind SW. brisk gales with passing squalls and rain; at daylight got the fore topgallant mast and royal mast on deck; at 8 set fore topsail; at 9 out 3rd reef of the main topsail; at 11 got all clear, at noon moderate and cloudy. Lat. by Obs. 18° 15′ N. long. by Chron. 85° 11′ E.

No. 14.—*Ship "Ann Lockerby," Capt. Burt.—Extract sent.*

Tuesday, June the 4th. In lat. 18° 55′ N. and long. 86° 30′ it commenced to blow heavy; the wind from N. to NNW. the height of the barometer was 28° 75′ and raining heavy; the gale still kept increasing till the morning of the 5th at 8 A. M. when it blew a complete hurricane, the wind at NNW. and it shifted round to WSW.; about noon the barometer was standing at 28° 15′; the ship at that time was in lat. 19° 5′ N. and long. 87° 6′ E. J. BURT.

No. 15.—*Ship "Eden," Capt. W. D. Cook.*

3rd June, Civil Time—Lat. 18° 22′ N. long, 86° 1′ E. P. M. strong winds variable WSW. to WNW. with rain. Barom. 29° 40′. 4 P.M. the same; with a heavy sea running; wind west; 8 P. M. increasing winds, in jib, mainsail, and mizen. Barom. 29° 30′ ditto weather, wind N.; 4 A. M. strong winds and squally; wind NWbN.; 8 A. M. hard gales, wore ship to the southward, Barometer 29° 10′; noon ditto weather, sun obscured; wind West, under bare poles; 4 P. M. hard gales with heavy squalls and a tremendous sea running; wind SWbW. Barometer 29° 00′. *4th June.* Midnight blowing a perfect hurricane at WSW. without intermission. Barom. 28° 80′ 4. A. M. ditto weather

Barom. 28° 70′; 6 A. M. struck by a heavy sea which hove the ship on her beam ends, shifted a great part of the ballast, washed the man from the helm, and part of the bulwarks away. 8. A. M. ditto weather, ship labouring heavily; set a storm mizen staysail. Wind WSW. Barom. 28° 60′. Noon ditto winds, with continued heavy rain, Barom. 28° 60′; 4 P. M. gale a little abated, set the main topsail close reefed. Barom. 28° 70′; 8 P. M. heavy squalls with lulls at times. Midnight, more moderate; set the foresail. Barom. 28° 80′ 4 A. M. Out two reefs main topsail, and set the fore out double reefed; 8 A. M. set the reefed mainsail; wind SW. Barom. 29°. Noon, strong breezes and hazy with less sea. Lat. observation 18° 1′ N. long. Chro. 86° 52′ E. Barom. 29° 25′. *June 6th.* Moderate weather; got soundings under the Black Pagoda at 2 A. M.

No. 16.—*Masulipatam, 15th July,* 1839.

DEAR SIR,—I have the pleasure to send you an extract from my Journal, we had neither thunder nor lightning, but there was a very heavy sea rolling in from the Eastward.

I have not a Simpiesometer.

RICHD. ALEXANDER.

Thermometer.		*Barometer.*		*June,* 1839.—*Masulipatam.*
Date.	Max.			Winds, &c.
June 1	87	29	700	From WNW. fresh, drizzling rain.
— 2	88	—	—	WNW. to SSW. do., very cloudy.
— 3	87	—	695	Ditto ditto ditto, drizzling rain.
— 4	83	—	633	Ditto blowing very fresh.
— 5	90	—	600	Ditto ditto ditto ditto.
— 6	91	—	625	Ditto to W. and SSW. very cloudy.

No. 17.—*Extract from the log of the Brig "Nine," Captain Denny, in the Bay of Bengal, June* 1839.

Saturday, 1st June, Nautical time.—Strong gale throughout, with heavy squalls and showers of rain, wind WbS. No observation. Lat. by account 14° 7′ N. long. 85° 28′ E., Bar. 28° 7′, Ther. 82°.

Sunday, 2nd June.—Heavy gale throughout, with constant rain and heavy squalls, wind WbS. No observation. Lat. by account 16° 7′ N., long. account 85° 52′ E. Bar. 28° 6′. Ther. 83°

Monday, 3rd June.—Strong gale throughout, with heavy squalls and rain. Wind WbS. No observation. Lat. by account 17° N., long. 86° 16′ E. Bar. 28° 6′. Ther. 84°

Tuesday, 4th June.—First and middle parts strong gale, latter more moderate, wind WbS. Lat. by account 17° 36′, long. 86° 43′ E.

Wednesday, 5th June.—Fresh gale throughout, with heavy squalls and showers of rain. Lat. by observation 18° 39′ N., long. Chro. 88° 18′ E.: On getting an observation, found we had a set of 60′ to the southward during the gale; wind S. W.

No. 18.—*The ship "Elizabeth," of Glasgow, Captain Dewar; homeward bound, left the Pilot, according to her protest, on the* 29*th May.*

On the 2d June, in lat. about 16° N. and long. 88° E. she experienced a very severe gale from the SW. with a heavy cross sea; hove too; but the sea was washing over her continually. About midnight she was struck by a heavy sea on the quarter, which started the whole of her stern frame; she bore up with seven feet water in her hold to the NE. and on the 3rd again hove too with her head to the NW. The wind hauling to the SW. she bore up about NNW. for the Sand Heads but could only reach Laccam's channel, where the vessel was driven on shore and lost; the captain and crew reaching Calcutta in a state of great distress and exhaustion through the Sunderbunds.

No. 19.—*Ship "Jumna," Captain Robinson.*

1*st June, Nautical time.*—Lat. 12° 25′ N. long. 85° E. dark gloomy weather, with much lightning to the NWbN. and NE. quarters, the wind freshening to a gale from W. or WSW. The barometer had been falling for several days before.

2*nd June.*—Lat. 15° 20′ N., long. 85° 30′ E. The gale continuing from W. with much rain.

3*rd June.*—Heavy gale from W. to WSW. generally; with lightning and ceaseless rain, and looking awfully dark to the NW. and N. The wind at times offering to shift in that direction, but never got further than WNW. and only remained there for a short time. Lat. 16° 40′ N. long. 85° 30′ E. at noon.

4*th June.*—The gale continuing, but blowing more in heavy squalls, with torrents of rain. The barometer 29° 19′ inches, lat. 17° 10′ N. long. 85° 35′ E.; P. M. more moderate; wind SW. fair, with hazy weather.

No. 20.—*The Brig "Laurel Amelia"* from Coringa towards Chittagong left Coringa roads, 3*rd June, Nautical time,* at 5 P. M. with light southerly breezes and clear weather; during the night the wind veered to West; at noon it was West, with drizzling rain and strong gales. Lat. and long. omitted in this log.

4th June.—Westerly winds, strong gales, vessel under courses, steering Eastward. During the night increasing gale, ship labouring very much; daylight the same, and weather very threatening, with a heavy sea on; prepared every thing for bad weather; noon, hard gales. No observation. Lat. by acct. 16° 56′ N. long. 82° 58′ E.

5th June.—P. M. hard gales with drizzling rain, increasing at midnight to a hurricane from the Westward. Daylight, and till noon, scudding under bare poles and laboring very much. No observation; lat. 17° 22′ N. long. 83° 44′ E. by account.

6th June.—Towards sunset hurricane abating a little; at midnight moderating; daylight under the foresail; noon more moderate, set the topsails. No observation. Lat. by acct. 18° 19′. N. long. 84° 29′ E. On the *7th* the weather fine.

It is clear that this vessel, being on the south side of the vortex made a fair wind of the hurricane; but the latitudes and longitudes must be wholly erroneous, since, though scudding before a hurricane from the Westward they give a NE. course made good along the shore! Captain Elson, of Chittagong, to whose politeness I am indebted for this log and that of the "Louisa" and "John William Dare," informs me that the last only is to be depended upon, as the Chittagong vessels are rarely provided with good instruments or able navigators. I have however felt myself bound to mark the track as here given, though I think it probable that on the 5th she was at least two degrees further to the Eastward, and I have therefore marked also her probable position.

The following very interesting remarks I received on the arrival of the "*Mobile*" from the Mauritius. It will be recollected that this ship was one of the outward-bound; having left her pilot on the 23rd May. I regret much that no latitudes and longitudes accompanied the first letter, so that I could only mark this vessel's drift approximatively on the chart as it was going to press; for this cause too this vessel is omitted upon the diagrams of the gale.

No. 21.—Extract from the log of the ship "Mobile," on a voyage from Calcutta to Mauritius, forwarded by Captain Ogilvy.

For several days prior to the *2nd June* the weather was for the season of the year remarkably fine, and the wind instead of SW. was veering round the compass. We had reached the latitude of 15° N. long. 84° E. in seven days from the Pilot. On the morning of the 2nd the swell increased considerably from the South, and at noon the mercury in the barometer, which had remained for some days steady at 29° 90′, was affected, and commenced falling fast. At this time (noon) we had a moderate breeze from the NNW. and the appearance of the

weather indicated not the slightest change. The breeze in the afternoon gradually increased, and at 4 P. M. took in one reef of topsails; Barometer 29° 55′. At 6 P. M. a very heavy black cloud rose in the Eastward; and apprehensive that a gale would come from that quarter, I altered my previous course of SSW. to SSE. in order to get more sea room. At 8 P. M. the barometer had fallen to 29° 40′, and the wind a fresh steady breeze from the NW. with slight showers of rain: took in 2nd reefs. 11 P. M. The breeze completely died away, and for the next seven hours it was nearly calm, the barometer stationary, and the black cloud still hanging in the Eastward, with very vivid lightning issuing from it.

At 7 A. M. *3rd June* the wind sprung up again from the NW. and commenced blowing so strong that all sail was taken in, excepting the close reefed main topsail; and the ship hove too. Noon, strong gale, with very heavy gusts of wind from the West. Bar. 29° 40′. Took the main topsail in, and spread a tarpaulin in the mizen rigging. *4th June* do. winds and weather, with a very high sea; by account lat. 15° 50′ N. longitude 84° 40′ E. *5th June*, wind veering to SW. and producing a tremendous cross sea, the ship rolling and labouring much. Bar. 29° 5′. latitude by account 16° 20′ N. 85° 20′ E. P. M. The Bar. rising, and the wind veering to SSW. with more moderate weather. The sea at this time, from the altering of the wind, was running in three or four directions, with immense crested tops which threatened instant destruction; but fortunately at this time it commenced raining heavily, which had a great effect in reducing the topping of the waves. On the *6th June*, by observations latitude 17° 10′ N. longitude 86° 15′ E. Found that we had drifted to the NE. 200 miles.

D. W. OGILVY.

No. 22. Barque "Susan," Captain Neatby,—Nautical Time.

31st May.—Wind WbN. to WbS. Bar. P. M. 29° 60′; midnight, 29° 55′; noon 29° 50′, Ther. 79°. Strong gale increasing from yesterday, with violent squalls and rain every hour. Lat. noon 12° 47′, long. 90° 43′ E.

1st June.—Wind WbN. to WSW. Bar. P. M. 29° 50′; noon 29° 40. Ther. 79° to 76° hard gale with constant heavy squalls and rain, with heavy sea, ship laboring much. At noon hard gale and heavy squalls. Lat. 14° 2′ N. 91° 14′ E.

2nd June.—Wind W½S. to WSW. Bar. 29° 40′ to 29° 36′. Ther. 79° to 78′; hard gale and violent squalls, with rain, and a tremendous heavy sea; ship laboring much, sent guns, provisions, &c. into the hold; ship lurching dreadfully. Lat. 14° 47′ N. long. 91° 47′ E.

3rd June.—Wind W½S. to WbS. Bar. 29° 40′, 29° 33′, and 29° 40′. Ther. 60°; hard gale with violent squalls and rain, and heavy sea throughout. Lat. 15° and long. 92° 14′ E.

4th June.—Wind WbS. to WSW. Bar. 29° 40′; hard gale, violent squalls, rain and lightning; latterly the squalls more moderate. Lat. 16° 19′ N. long. 69° 53′ E. By observation find a current to the SW. at the rate of twenty miles per day for the last four days.

5th June.—Wind WSW. to SW. strong gale and squally, but moderating latterly, and the sea going down. Bar. 29° 40′ to 29° 56′, lat. 17° 59′ N., long. 88° 34′ E.

No. 23.—The ship "*Indian Oak,*" Capt. Rayne, left Madras roads at 10 A. M. 4th June 1839, Nautical time, having a passenger on board for Vizagapatam. She ran up along the coast with moderate breezes, but on the night of the 5th to 6th June it was so very hazy that Capt. Rayne could not obtain an observation; the heavenly bodies being obscured. His barometer fell from 29° 7′ at 8 P. M. on the 5th to 29° 6′ at 4 A. M. on the 6th, the weather having assumed so very threatening an appearance, with a heavy jerking sea rising, that he prepared for bad weather, and kept under weigh whilst communicating with the shore, and landing his passenger at Vizagapatam; he had however no stormy weather. This vessel's log is important as marking, together with the memorandum from Masulipatam, that the gale was only *seen*, but not *felt* along the coast below Juggernath.

No. 24.—The Barque "*Lady Macnaghten,*" Captain George Hardwick, experienced a severe gale beginning with strong squalls from the West and heavy rain at noon 30th May 1839, lat. 10° 40′ N. long. 88° E. By noon the next day, 31st May, in 12° 45′ N. 87° 14′ she was hove too under close reefed main topsail, and continued so under storm sails on the 1st, 2nd, 3nd, and 4th June; wind from WbS. to SWbS. blowing a very severe gale with very heavy sea, causing the vessel to labour excessively and ship water over all. At noon on 4th, after which the gale moderated, she was in lat. 14° 51′, long. 88° 16′ E. and found that during the gale she had experienced a current of about thirty-two miles per day to the SW. from the 31st May to the 4th June; on which last day the Barometer being then at the lowest, stood at 29° 17′.

No. 25.—Brig "*Petrel,*" Capt. Turnan, *1st June* 1839. *Nautical time.*—At noon in lat. 5° 13′ N. long. 85° 20′ E. Bar. 29° 30′. Ther. 92′, strong breezes from WSW. and hazy weather.

2nd June.—Till midnight blowing strong. A. M. blowing hard with hazy weather and a heavy sea; large white clouds driving very quickly, but clearing at intervals; wind from WSW. to SW. at noon, when the lat. was 8° 31′ N., long. 85° 50′ E. Bar. 29°, Ther. 86°.

3rd June.—Hazy in the afternoon, and first part of the night strong breezes, W. to WSW. till midnight warm weather. A. M. Hard gale, WbS. and a heavy sea till noon. Lat. 11° 26′ N., long. 85° 24′ E. Bar. 29° 48′ Ther. 95°.

4th June.—Hazy throughout and exceedingly warm. Sea high and confused, *and coming at times from the northward!* Hard gales WbS. WSW. ship taking much water on deck. At noon, lat. 13° 44′ N. 84° 50′ E. Bar. 29° 43′. Ther. 86°.

5th June.—Wind WSW. to SW. P. M. Hard gales, but moderating latterly. A. M. confused sea from the northward, hazy; barometer falling at 4 P. M. to 29° 30′ but rising towards morning to 29° 50′. Ship and rigging covered to day with a fine red dust.* At noon, lat. 16° 22′ N. long. 84° 34′ E. Bar. 29° 38′, Ther. 86°.

6th June.—Strong and hard gales WSW. with hazy weather. At 11h. 30′ made the land. Noon, lat. 18° 30′ N. long. 84° 34′ E. Bar. 29° 40′ Ther. 86° Sky clearing up, and sea going down with appearances of settled weather. *Note.* We had not a drop of rain from leaving the lat. of 2° 30′ N. on 29th May until in Saugor roads on the 9th June.

No. 26.—Barque "John William Dare," Captain Gibson, *at anchor off the Island of Cheduba in 3½ fathoms water; on 1st June,* 1839. *Civil time.*—Lat. observed 18° 44′ N.; long. by three Chron^{s} 93° 50′ E. Bar. 29° 80′, Ther. 85°. Latter part fine and clear. Bar. 29° 75, Ther. 84°.

2nd June.—First part light breeze and clear, with lightning to the Southward; daylight freshening breezes, with flying showers of rain and light squalls, barometer falling. At noon strong breezes with squalls, and dark threatening appearance. Bar. 29° 40′, Ther. 89°. 2 P. M. Breeze increasing; preparing for bad weather. Bar. 29° 30′. Heavy sea rolling in from the Southward, ship rolling frightfully. 8 P. M. Breeze increased to a gale with tremendous sea. The ship, though drawing only eleven feet six inches water, struck by the heel and unshipped the rudder, secured the rudder, slipt the chain, cast to seaward, and an-

* This is a singular phænomenon. The nearest point of the coast directly to windward of the ship is about Coringa, distant 400 miles. It would seem to indicate that the gale had blown over the table land of the Deccan, where it would probably find plenty of red dust. The Laurel Amelia and Indian Oak seem thus to have been sheltered by the Coromandel range of hills, as we see in the land breezes in an offing in fine weather.

chored again in four fathoms water. Latter part weather as before. Bar. 29° 30′.

3rd June.—First part heavy gale from SSE. with a tremendous sea; vessel labouring heavily, and making thirty inches of water per hour. Daylight, barometer rising; strong gale, with heavy thunder and rain, and dark heavy appearance all round; noon, gale abating, with heavy squalls, thunder, lightning, and rain. Bar. 29° 50′, Ther. 84°. Latter, gale abating, with heavy rain and a high sea. Bar. 29° 60′.

4th June.—First part strong breezes with squalls, thunder, and heavy rain; daylight, breeze abating; Bar. 29° 75′ Ther. 85°. Shipped the rudder, and sent up topgallant yards and masts. Latter part smart breezes. Bar. 29° 80′.

5th June.—Smart breezes from SE. and a high sea rolling in from SW.; made sail for Chittagong. The direction of the wind has been omitted in this log on the 1st, 2nd, and 4th, but it seems evident that it was from the S. or between S. and SSE. throughout. The log is very valuable, as shewing that the gale here, on the extreme Eastern side of the Bay, was at its height in the night between the 2nd and 3rd June.

No. 27.—Barque "Louisa," in the Harbour of Akyab.

Saturday 1st June, 1839.—Moderate breezes and cloudy weather. Direction of the wind not stated, and nothing further in the log.

2nd June, 1839.—Commences with fresh breezes and cloudy weather; middle and latter parts, hard gales with small rain; winds Easterly.

3rd June, 1839.—During these twenty-four hours brisk gales and showers of rain; winds Easterly.

4th June.—During these twenty-four hours the same as yesterday.

5th June.—During these twenty-four hours East winds with gales, and falls of rain.

6th June.—For these twenty-four hours, SW. winds and moderate.

To exhibit the foregoing Logs in a collected view, for ready reference, I have arranged all the principal facts in the following series of Tables from the 1st to the 5th June, exhibiting thus at one view the weather experienced by the different ships, and their positions *at noon* on the same day. No account has been taken of the small difference of apparent noon occasioned by the difference of longitude, as there is nothing which requires this degree of exactness. It will be remarked that throughout the difference between the Easterly and Westerly winds occurs about lat. 19° 30′. The log of the "Indian Oak" is omitted, as not being of importance.

Tabular view of the Gale and Hurricane in the Bay of Bengal, from 1st to 5th June, 1839.

Date, Civil time.	Names of Vessels and Places.	Wind and Weather.	Lat. N.	Lon. E.	Bar.	Simp.	Ther.	Remarks.
June 1st. Noon.	Calcutta, ...	NE. Cloudy and squalls at times,	22..34	88..22	29·54	..	92	
	Diamond Harbour, ...	Light variable airs and Cloudy,	22..11	88..11	..	..	84	
	Kedgeree, ...	Do. do. Easterly do. do. thunder and lightning, ...	21..52	87..59	..	..	86	
	Upper Light Vessel, Hope, ...	W.toS. variable. Cloudy,.. ..	21..26	88..07	29·54	..	..	
	Lower Light Vessel, Beacon, ..	NE.toENE. Cloudy & unsettled,	21..04	88..27	..	..	..	Heavy swell.
	Jane Pilot Vessel, ...	ENE.toESE. Light & variable fine weather, ...	21..00	88..23	..	..	..	At anchor.
	H. C. Ship Amherst, ...	Variable sharp squalls from SE. toNE. with rain, ...	20..56	..	..	..	..	Sharp lightning to NE.
	Saugor Pilot Vessel, ...	NNE.toN. and cloudy to E. ..	20..28	87..32	..	..	..	At anchor, AM. winds SE. to southward.
	At Pooree, or Juggernaut Pagoda,	....	19..48	85..45	..	..	..	
	John William Dare, ...	Fine and clear, ...	18..44	93..50	29·75	..	84	At anchor off Cheduba.
	Mary Somerville, ...	NNE. to WNW. Light air, very hot weather, ...	18..13	85..17	29·65	29·78	86	
	Justina, ...							
	Ann Lockerby, ...							No Logs obtained.
	Eden, ...							
	At Masulipatam, ...	....	16..10	81..00	29·70	..	85	
	Nine, ...	W.bS. Strong gale with heavy squalls and rain, ...	14.. 7	85..28	28· 7	..	82	
	Elizabeth, ...							
	Jumna, ...	W.toWSW. Freshening to a gale. Dark gloomy weather, ...	12..25	85.. 0	..	..	..	Bar. falling. Much lightning to NW. N. and NE.
	Susan, ...	W.bN.toWSW. Hard gale with heavy squalls and rain, ...	14.. 2	91..14	29·50	29·40	78	
	Lady Macnaghten, ...	W.bS.toSW.bS. a very severe gale, hove too under storm sail.	13..50	88..00	..	..	..	Heavy sea. Shipping water over all.
	Petrel, ...	WSW. Strong breezes and hazy,	5..13	85..20	29·30	..	92	

Date, Civil time.	Names of Vessels and Places.	Wind and Weather.	Lat. N.	Lon. E.	Bar.	Simp.	Ther.	Remarks.
June 2nd. Noon.	Calcutta, ...	E.bS. Heavy clouds and passing squalls with rain.	22..34	88..22	29·47	..	90·	
	Diamond Harbour, ...	Variable, cloudy and rain.	22..11	88..11	..	..	83·	
	Kedgeree, ...	Northerly with Easterly squalls, cloudy and rain, ...	21..52	87..59	..	..	83·	Calms, thunder and lightning.
	Upper Light Vessel, Hope, ...	Northerly wind, with heavy squalls from Eastward, ...	21..26	88..07	29·52			
	Lower Light Vessel, Beacon, ..	ENE. North breezes but threatening a gale,....	21..04	88..27				
	Jane Pilot Vessel, ...	Fresh from NE. with squalls and rain.....	21..04	88..23	..	..	..	At Anchor; strong set to the Westward.
	H. C. Ship Amherst, ...	ENE.toNNE. in heavy squalls and rain....	20..56	88..23				
	Krishna Pilot Vessel, ...	NE. to E. Squally and threatening to Eastward.	20..43	87..25				
	Saugor Pilot Vessel,..	Squally from the Eastward... ..	20..28	87..32	..	..	..	At anchor.
	At Pooree, or Juggernaut, ...	Squally from the Eastward... ..	19..48	85..45				
	John William Dare, ...	S.bE. Strong breezes, squalls and dark threatening weather...	18..44	93..50	29·40	..	82·	At anchor at Cheduba. Bar. falling to 29·30; P.M. Heavy sea from Southward.
	Mary Somerville, ...	Lt. breezes WNW. to fresh from North.	18..56	85..56	29·61	29·73	85·	P M. Severe squalls from NE. car. away F. topmast and F. & Main T. G. Mast.
	Justina, ...	....						No Logs for this day obtained.
	Ann Lockerby, ...	....	..	..	..	..	..	
	Eden, ...	....	..	..	..	..	..	
	At Masulipatam, ...	Blowing fresh WNW. to SSW. Drizzling rain.	16..10	81..00	29·70	..	88.	
	Nine, ...	W.bS. Heavy gale, severe squalls and rain.	16.. 7	85..52	28· 6	..	83·	
	Elizabeth, ...	Severe gale from SW.	16..00	88..00	..	..	..	Heavy cross sea; stern stove in! bore up.
	Jumna, ...	West to WSW. Gale and rain.	15..20	85..30				
	Mobile, ...	Moderate from NNW.	16..20	84..30				
	Susan, ...	W.bS. to WSW. Hard gale, violent squalls and rain,.....	14..47	91..47	29·38	..	79·	Tremendous cross sea.

Date, Civil time.	Names of Vessels and Places.	Wind and Weather.	Lat. N.	Lon. E.	Bar.	Simp.	Ther.	Remarks.
June 2nd. Noon. (*Continued.*)	Lady Macnaghten, ...	W. b S. to SW.bS. Very severe gale. Hove too under storm sail.	14..10	88..00	..	..	..	Heavy sea.
	Petrel, ...	W S W. to S W. Blowing hard. Hazy weather.	8..31	85..50	29·00	..	86·	
Monday, June 3rd.	Calcutta, ...	E. b N. Fresh gale, heavy squalls and rain at times, ...	22..34	88..22	29·43	..	89·	
Noon Centre of the Hurricane about Lat. 19·53 N. Long. 89·45 E.?	Diamond Harbour, ...	NE. breezes, frequent rain, ...	22..11	88..11	..	..	84·	
	Kedgeree, ...	Heavy squalls N E. to East, rain and unsettled appearance.	21..52	87..59	..	..	84·	
	Upper Light Vessel, Hope, ...	Strong E S E. winds inclining to a gale at ENE.	21..26	88..07	29·41	..	..	Gale increasing rapidly PM. E. to ENE.
	Lower Light Vessel, Beacon, ..	Increasing to a moderate gale from E N E. heavy squalls,	21..04	88..27	..	..	..	Heavy sea on.
	Jane Pilot Vessel, ...	NE. Strong and increasing gales, with rain; threatening to NE.	21..80	88..23	..	..	..	At anchor.
	H. C. Ship Amherst, ...	ENE. Increasing gale and rain.	..	..	..	..	..	Sea rising fast.
	Krishna Pilot Vessel, ...	Pleasant and cloudy NE. to E.	20..37?	87..26?	..	..	..	Cross sea.
	Sarah, ...	ENE. Strong gale, and high sea.	2 0..30	88..02				
	Saugor Pilot Vessel, ...	N. Strong breezes.	20..28	87..32	..	..	..	At anchor, hvy. swell from SE. gale freshg. from N E at midnight.
	At Pooree, or Juggernaut, ...	N. Hard gale heavy clouds and rain, ...	19..48	85..45				
	John William Dare, ...	S S E. Heavy gale A. M. dark heavy weather, ...	18..44	93..50	29·50	..	84·	At anchor at Cheduba PM. gale abating; Br. rising; rain & hv. sea.
	Mary Somerville, ...	Very unsteady, mostly N W. with heavy squalls, ...	19..00	85..29	29·25	29·40	86·	
	Justina, ...	N. Increasing gale heavy squalls and rain.	19..14	86..06				
	Ann Lockerby, ...	....	..	..	29·40	..	..	No log.
	Eden, ...	Blowing strong W S W. to W N W. and rain, ...	18..22	86..01	29·69	..	87·	Barometer falling.
	At Masulipatam, ...	W N W. to S S W. Drizzling rain, cloudy, ...	16..10	81..00	28·6	..	84·	

Date, Civil time.	Names of Vessels and Places.	Wind and Weather.	Lat. N.	Lon. E.	Bar.	Simp.	Ther.	Remarks.
Monday, June 3rd. (*Continued.*)	Nine, ...	Strong gale and heavy squalls W.bS.	17..00	86..16	..	..	..	Scudding for a port no log.
	Elizabeth, ...	Gale at SW.	..	..	..	..	..	
	Jumna, ...	Heavy gale from W. to WSW.	16..40	85..30	..	..	..	Lightg. & ceaseless rain, awfully dark to N.W. & N. wind offering to shift there.
	Mobile, ...	Strong gale and heavy gusts from the Westward, ...	15..00	84..00	29·40			
	Laurel Amelia, ...	Westerly drizzling rain and strong gales,....	..	..	..			
	Susan, ...	W.S. W.bS. Hard gale, violent squalls and rain, ...	15..00	92..14	29·35	..	80·	
	Lady Macnaghten, ...	W.bS. to SW.bS. Very severe gale; hove too under storm sail.	14..25	88..00	..			
	Petrel, ...	W.bS. Hard gales.	11..26	85..24	29·18	..	95·	Heavy sea.
Tuesday, June 4th. At Noon. Centre of the Hurricane about 19·36 N. 88·10 E.	Calcutta, ...	East, heavy squalls and gusts with rain, ...	22..34	88..22	29·40	..	86	
	Diamond Harbour, ...	NNE. Strong breezes, frequent rain, ...	22..11	88..11	..	..	84	
	Kedgeree, ...	Heavy Easterly squalls, rain and unsettled weather, ...	21..52	87..59	..	..	85	
	Upper Light Vessel, Hope, ...	ESE. Heavy gale and rain, ...	21..26	88..07	29·33	..	..	Mdnight. veering to SSE. Heavy sea on, gloomy weather.
	Lower Light Vessel, Beacon, ..	ESE. to SE. do. do. rain.	21..04	88..27	..	..	..	Sea washing over every thing; gloomy appearance all round
	Jane Pilot Vessel, ...	From E. to ESE. and SE. Hard gale and rain, ...	21..00	88..23	..	..	..	At anchor; dark gloomy weather and heavy sea.
	H.C. Ship Amherst,....	ENE. A hard gale and rain,....	..	..	..	..	..	Under bare poles. At 4 P.M. a hurricane at SSE. tremendous cross sea.

Date, Civil time,	Names of Vessels and Places,	Wind and Weather.	Lat. N.	Lon. E.	Bar.	Simp.	Ther.	Remarks.
Tuesday, June 4th. (*Continued*)	Krishna Pilot Vessel, ...	NNW. to NNE. Fresh gales, hard squalls, ...	20..10	87..15?	..	..	..	High cross sea, stood off land.
	Sarah, ...	ESE. Hard gales with rain, ...	..	..	28·88 28·56	8. P.M. midnght	28	2 P. M. Wind veered to the South.
	Saugor Pilot Vessel, ...	NE. Hard gale, ...	20..28	87..32	..	..	..	At anchor, heavy sea.
	At Pooree, or Juggernaut, ...	North. Hard gale, incessant rain,	19..48	85..45				
	John William Dare, ...	South, moderate, ...	18..44	93..50	29·75	..	85	At anchor at Cheduba. 5 P. M. Shifted suddenly to the W. & veered gradually to SW.
	Mary Somerville, ...	W. Fresh gales with heavy rain,	19..16?	85..18?	29·15	29·30	86	Heavy sea from SE. P.M. gale increasing from SW.
	Justina, ...	WSW. Severe gale veering to South Westward, P. M.	18..47?	85..40?	..	..	..	Lying with yard arms at times in the water; tremendous sea running; lost a boat washed away.
	Ann Lockerby, ...	N.toNNW. Commenced to blow heavy and rain, ...	18..55	86..30	28·75	..	..	Gale increasing.
	Eden, ...	SW.bW. Hard gale increasing to a hurricane at WSW. ..	..	..	29·10			
	At Masulipatam.	WNW. blowing very fresh, ...	16..10	81..00	29.63	..	83	
	Nine, ...	W.bS. moderating to fresh gale,	17..39	86..43	..			
	Elizabeth, ...							
	Jumna, ...	From W.toWSW. Gale continuing and heavy squalls.	17..10	85..35	29·19	..	..	Preparing for bad weather.
	Mobile, ...	Heavy Westerly gales, ...	15..50	84..40				
	Laurel Amelia, ...	West, hard gales, ...	16..56	82..58	..	..	..	A current has been setting 20, to the SW. for the last 4 days.
	Susan, ...	WSW. Hard gale violent squalls	16..19	89..53	29·40			
	Lady Macnaghten, ...	W.bS.toSW.bS. Very severe gale; hove too under storm sails, ...	14..51	88..16	29·17	..	..	Current of 32 per day to the SW. for the last 4 days.
	Petrel, ...	W.bS.toSW.bS. Hard gales, hazy	13..44	84..50	29·43	..	86	Sea confused, and coming at times from the Northward, shipping much water

Date, Civil time.	Names of Vessels and Places.	Wind and Weather.	Lat. N.	Lon. E.	Bar.	Simp.	Ther.	Remarks.
June 5th. Noon, Centre of the Hurricane, about Lat. 19·25N. Lon. 87·1 E.	Calcutta, ...	S. b E. Veering to Southward, strong squalls and rain, ..	22..34	88..22	..	..	..	No observation for Barometer.
	Diamond Harbour, ...	E. to SSE. Strong gales & squalls	22..11	88..11	..	..	84	
	Kedgeree, ...	SE. to S. smart gale and rain,	21..52	87..59	..		85	
	Upper Light Vessel, Hope, ...	South; gale decreasing, rain,	21..26	88..07	29·46		..	Heavy sea.
	Lower Light Vessel, Beacon,....	S S E. to South, blowing hard in squalls, ...	21..04	88..27	..	..	..	Heavy sea.
	Jane Pilot Vessel, ...	SSE. to S. Heavy squalls, ...	21..00	88..23	..	..	..	At anchor.
	H. C. Ship Amherst, ...	Gale moderating from SSW. ..	20.. 3	87..00	..	..	..	Heavy cross sea.
	Krishna Pilot Vessel, ...	North to West and SW! hard gales.	19..40	86..27	..	..	..	1 P.M. Wind veered from N. to SW. furious gale.
	Sarah, ...	E S E. Moderating and veering round to southward ...	19..42					
	Saugor Pilot Vessel, ...	ESE. Hard gale, ...	20..28	87..32	..	..	..	Atanchor; P.M. SE. & SSE.at midnight.
	At Pooree, or Juggernaut, ...	S W. Gale continuing, cloudy but no rain, ...	19..48	85..45				
	Mary Somerville, ...	S W. Strong breezes increasing to a severe gale to South	..	..	..	..	..	Veering toSW; P.M. Sea from the S. W.
	Justina, ...	SW. Moderating, ...	18..15	85..11	..			
	Ann Lockerby, ...	Hurricane at N N W. shifting suddenly to W S W. at noon.	19.. 5	87.. 6	28·15			
	Eden, ...	SW. Moderating.	18.. 1	86..52	29·25			
	At Masulipatam, ...	WNW. Blowing very fresh, ..	16..10	81..00	29·60			
	Nine, ...	SW. Fresh gale and heavy squalls, ...	18..39	86..18	..	..	..	Current of 60, to the S. during the gale.
	Elizabeth, ...	....	..	..	..	..	..	Running for a port.
	Jumna, ...	....	..	..	..	..	..	No log for this day.
	Mobile, ...	Severe westerly gale, ...	16..20	85..20	..	..	..	
	Laurel Amelia, ...	Westward, blowing a hurricane,	17..22	83..44	..	..	..	Scuddin gunder bare poles.
	Susan, ...	WSW. and SW. moderating,..	17..59	88..34	29·40	29·56	83	
	Lady Macnaghten, ...	WSW. Moderating, ...	..	..	..	..	..	
	Petrel, ...	W S W. to S W. Hard gales but moderating, hazy, ...	16..22	84..34	29·38	..	86	At 4 P.M. Bar. 29·32 A confused sea from the North.

I have next delineated the whole of the tracks with the winds at noon upon the general Chart, and from these are deduced the centres, which last I have marked by a single circle or two for each day, and from the centres I estimate the course of the hurricane. To render the whole more distinct, three diagrams are also given, to half scale, upon which I have a few remarks to make.

In considering these diagrams and tables, the reader will be struck with some few anomalies; that is, he will observe that the arrows do not always show the wind as blowing in *exact* circles, and that in one or two instances, they are altogether different from the others, though not absolutely contradictory.

I take these few discrepancies mostly to arise from some one of the following causes:—

I. The carelessness of many in noting the direction of the wind, or the not noting it *at the time*.

II. Their erroneous estimation of its direction when looking at a weather-cock or dog-vane, and, if a ship is going fast, the not allowing for the effect of her motion upon it.*

III. On shore, local circumstances, such as houses, hills, rivers, and the like, which may often produce differences.

IV. At sea the vicinity of the land, ranges of mountains, &c. which when the gale or hurricane strikes them, occasion a re-action altering the direction of the wind.

V. As it has been necessary to fix upon one instant of time at which to compare the wind and weather experienced by different vessels, noon has of course been chosen; but when the winds are varying, it may occur that the one marked about noon is a little more unfavourable to the appearance of the diagram than that which perhaps was the predominant one throughout the day; as, however, it would have appeared like accommodating the facts to the hypothesis, I have preferred allowing them to stand as marked, taking a mean point where the limits of the variation of the wind are expressed, such as SE. when the words "between South and East," are used.

VI. The positions of the vessels are rarely accurately ascertained in a severe gale.

Let us consider these causes separately. The careless habits of seamen are well known, and that these should extend to what is apparently the unimportant matter of noting the exact direction of the wind is not surprising, and is well known to every intelligent man, who has commanded a vessel. In severe weather too when a vessel

* The eddy wind from the mizen staysail will sometimes in a small ship affect the dog-vane.

is lying with her yard arms in the water, boats and booms washing away, and sails blowing from the yards, those on whom the responsibility rests have far other matters to engage their attention than the exact direction of the wind; and in many vessels, where perhaps the captain and chief mate are the only persons who can take charge of the deck in such weather, the log is rarely marked till the gale ceases, and it is written up perhaps at a still later period. "You must not look for very great exactness in my log, Sir, for to tell the truth, every word of it was written from memory after the gale was over; myself and the mate had something else besides writing to do while the gale lasted," was literally said to me by one commander; and no doubt this is necessarily true of many, as those who know the severe fatigue of body, and excessive anxiety of mind which the masters of small vessels must undergo in bad weather will readily allow.*

2nd. That when the vessel is going fast through the water the dog-vane shews the wind to be further a head than it really is, is well known to all; when close hauled on a wind, as the vessel lies about six points from it, there is no mistake of any consequence to be made, but with the wind abeam or a point or two abaft it, many officers do not, if they know it, make due allowance for the ship's motion. If the wind appears to be abeam it is put down so, though it is perhaps half a point or more abaft it. The experienced and attentive do not of course fall into these errors; but how many are there who unite both experience and attention? Looking at a weather-cock on shore, or merely estimating the direction of the wind, is more liable to be inaccurate; even to the extent of a point or two.

3rd. Local circumstances, such as I have alluded to, require no remark, particularly when an observer is living in a large town, or has not a very exact idea of his meridian; which but few have.

4th. This cause will be more particularly alluded to in Part II of this memoir; at present with reference to one diagram the anomalies about Juggernaut, or as the ships approach the shore, seem quite probably referable to the repulsion of part of the vortex from the high land behind Cuttack; or to the great current of the regular monsoon gale, blowing up along the Coromandel hills. See Part II.

5th. The fifth cause explains itself, as stated.

* *Note.*—While this is going to the press I meet in the Nautical Magazine for March 1839, in a valuable paper on a hurricane, "Yesterday I did not put down the latitude and longitude. I calculated it roughly in my own mind, and satisfied myself the Barque was driving clear of the shoals. I was too much occupied, both mentally and corporeally, to enter into minute calculations."—*Extract from a letter signed 'Mexicano,' giving an account of a gale off the coast of Mexico.—Nautical Magazine, March*, 1839.

6th. The sixth requires none to seamen, but the unprofessional reader should be told, that, not only from the motions of the vessel and the haziness of the horizon, observations during stormy weather are entitled to but little confidence, but moreover they are but very seldom obtained, the celestial bodies being rarely visible; thus the latitude and longitude of the vessel is in truth but little better than guessed at if she is lying to, because neither the direction nor the rate of her drift can be well *measured* by the log, or accurately known by the compass; as it may be when scudding. Hence it must be borne in mind that, though the wind may be rightly noted, the ship's position may be to a certain extent erroneously laid down, and in some instances upon the diagram, if the vessel be supposed to have been little further to the East or West, or to the North or South, the apparent difference will disappear.

The Sarah in the diagram of the 4th is an instance. By the direction of the wind she should be further to the Eastward; but I estimated her to be where I have placed her. At 2 P. M. also, as will be seen by her log, the wind veered to the Southward with her; the centre of the vortex having passed her at no great distance; the weather moderating till 4 P. M. when it again came on to blow a hard gale.

It may be observed to, and this is important, that while probably, and frequently no doubt from the causes just enumerated, there are discrepancies in the winds as laid down, these rarely, or never, amount to *contradictions* of the theory; which defines a hurricane to be a severe gale blowing and veering round in a circular direction, while it is also moving onwards. I should note also that in more than one instance I have found no wind marked exactly at noon, but one at 10 A. M. or 2 P. M. With this explanation of the diagrams and charts the unprofessional reader will be better able to make allowance for the differences he may meet with; and all will observe how well the blank which occurs on the eastern side of them will be filled up by the logs of the homeward bound vessels. The description of the Map No. II. belongs to Part II. to which it has reference.

The slow rate of progress of our hurricane will not fail to be remarked. I think it probable this is owing to the vortices being *pent up* as it were between the course of the gale and the Coromandel Hills. I have further adverted to this also in Part II.

A few more remarks on the Logs and Charts may not be without interest both to the unprofessional reader, and to the seaman who may not at once perceive how they bear upon the theory of the circular motion of storms; and that this is from East to West by the North, or contrary to the hands of a watch, on the North side of the equator.

Let us begin with the H. C. S. *Amherst,* which we find very properly stood out to sea from the tail of the Eastern sea reefs. Had her Commander not been acquainted with the Sand Heads, she might have been placed in great danger by standing in, as she then must have anchored in a most perilous position. This was probably the fate of the unfortunate *Protector*, in which 135 soldiers were lost beside the crew and the passengers, in the gale of October, 1838.*.

The Pilot vessels, whose business moreover it was to keep as near to their station as they could with safety, were well managed of course; as were also the *Sarah* and I believe the *John Hepburne,* a Schooner from Rangoon; though I have not been able to procure this last vessel's log.

On the South-side of the hurricane, however, many of the vessels seem running into it, and this some of them certainly did. The *Mary Somerville* was fortunately prevented from doing so, by the accident to her foretop-mast, obliging her to lie too, but the *Ann Lockerby, Justina,* and *Eden* seem to have run right towards it.

The *Susan's* track shows a course made much too far to the Westward for the winds laid down; this is only to be accounted for by the erroneous estimate of her position, and the Westerly current which is adverted to in the logs of the *Nine* and *Jane.*

The barometrical observations are for the most part so few and scattered that I have been unable to trace any connected series of them worth adverting to. As usual the barometer has clearly enough announced the approach or vicinity of bad weather, and the Simpiesometer still earlier. I have before stated that I was unable to obtain more than *one* single notice of the heights of the vessels' barometers in the port of Calcutta! and thus we are left to doubt as to the correctness of even those instruments of which we have the registered observations. Thus the 'Nine's' barometer indicated a very remarkable depression on the 1st, 2nd, and 3rd June, but was it a correct one? The low rate of pay on board our merchant ships makes it a heavy tax upon a commander to provide himself with instruments from the best makers. I cannot quit this part of the subject, however, without citing the highly creditable barometrical observations of Mr. Hudson, commanding the Honorable Company's Floating Light Vessel "Hope," marked in the tables as the Upper Light Vessel. I have only there quoted his barometer for noon; the following is the register annexed to his log, and brief notes of the weather from it —

* The remarks on the appearance of the Arracan mountains on the 29th, and the clear sky and peculiar sensibility to noise on board at the approach of the gale, are very interesting: the two last may have been electrical phænomena, and the first will remind the seaman of "the Devil's table cloth," at the approach of a South-easter in Table Bay.

1st June, ..	Bar.	
8 A. M. ..	29·56	East to NEbE. winds and cloudy to the WN.
Noon, ..	29·54	NE to ENE. and cloudy.
8 P. M. ..	29·53	

2nd June, ..	Bar.	
8 A M. ..	29·53	ENE. cloudy unsettled, midnight heavy squalls from
Noon, ..	29·52	ENE. with rain.
8 P. M. ..	29·47	

3rd June, ..	Bar.	
7 A. M. ..	29·43	Strong NE. winds and threatening weather.
Noon, ..	29·41	Strong ESE. winds inclining to a gale.
1·30 P. M. ..	29·37	Increasing to a gale; prepared for bad weather.
2·30 P. M. ..	29·33	
6 P. M. ..	29·33	Gale increasing at ENE.

4th June, ..	Bar.	
4 A. M. ..	29·33	Gale continuing in hard gusts from East.
8 A. M. ..	29·33	Weather as before.
Noon, ..	29·33	Gale blowing in heavy squalls from ESE.
8 P. M. ..	29·33	Gale continuing, veering to SE.
Midnight, ..	———	Gale veering to SSE.

5th June, 8 A. M. ..	29·46	Gale still continuing at SSE. veering to S.
Noon, ..	29·46	Gale *decreasing* a little, wind at S.
8 P. M. ..	29·46	Strong breezes at S.

From the height of this Barometer on the 1st as compared with that at the Surveyor General's Office in Calcutta, we may assume it to be a nearly correct one; and if these dates are compared with the assumed track of the hurricane—at least at 120 miles distant from Captain Hudson's vessel—it is scarcely an exaggeration to say that this instrument was marking the passage of it over his meridian with the regularity of a clock! A stronger instance of the vast utility of the Barometer and the use of having them on board all stationary vessels could scarcely be adduced. A good Simpiesometer would have given us still more curious data. It is, I hope, becoming daily more and more evident that the owners of all vessels should be obliged to furnish them with good instruments of all kinds; and indeed if they knew their own interests they would always do so. The cost of a very small portion of the delay and mischief arising from damage occasioned by the want of one,—and these are frequently not losses falling upon underwriters,—would far more than repay the cost.* The seaman who is watching his Barometer is watching his ship; and watching it too in the most intelligent manner.

* Col. Reid's observation on this subject deserves to be quoted. "Every policy of insurance should bind the owners or masters of a ship insured to provide a Barometer, and the protest should be required to shew that it was registered at least once in every watch. But it ought to be registered oftener; and within the tropics, during the hurricane season, every time the log is heaved." I should add that a Simpiesometer ought always to be insisted upon also.

ART. V.—*Note on the "Trochilus and Crocodile" of Herodotus.*

To the Editor of the Asiatic Journal.

DEAR SIR,—As the recent very curious and instructive work of Mr. Wilkinson on *the Manners and Customs of the Ancient Egyptians* is likely to attain a deserved celebrity, it may be as well to correct a mistake into which he has fallen, as to a fact in natural history, particularly as it affects the credit of the Father of History, whose work, notwithstanding its imperfections in many other respects, will generally be found correct in all matters that came under the author's personal observation.

Mr. Wilkinson says, vol. iii. p. 79,

"Herodotus enters into a detail of the habits of the Crocodile, and "relates the frequently repeated story of the *Trochilus* entering the "animal's mouth during its sleep on the sand banks of the Nile, and "relieving it of the leeches which adhere to its throat. The truth of "this assertion is seriously impugned, when we recollect that leeches "do not abound in the Nile; and the polite understanding supposed "to exist between the Crocodile and the bird, becomes more impro-"bable, when we examine the manner in which the throat of the "animal is formed; for having no tongue, nature has given it the "means of closing it entirely, except when in the act of swallowing, "and during sleep the throat is constantly shut though the mouth "is open."

Now on this passage I have to observe, first, that I have seen many Crocodiles caught, but very few that had not many leeches adhering to the inside of their mouths, and that these insects also infest the *Argeelah*, and other animals which feed in the Ganges. Secondly, these leeches are not the *Hirudo medicinalis*, which Mr. Wilkinson is probably correct in asserting not to be common in the Nile, as that species is not usually found in running streams. The leech in question seems to me (I speak with diffidence, being no entomologist) to belong to the genus *Pontobdella*, one species of which infests Cod, Skate, and other fish on the coasts of England. I have no doubt these insects will be found as abundant in the Nile as they are in the waters of Bengal. Thirdly, Herodotus says nothing about the throat of the Crocodile, though his translator Mr. Beloe does. Herodotus says, "the Trochilus entering the Crocodile's mouth devours the leeches," for his words are, ἐνθαῦτα ὁ τροχίλος ἐσδύνων ἐς το στόμα αυτοῦ καταπίνει τὰς βδέλλας·*

* Herod. Euterpe. clxviii.

The Crocodile is not said by Herodotus to be sleeping during the operation, as Mr. Wilkinson asserts, otherwise the observation, "that pleased with the service, he never injures the Trochilus," would be absurd—*ωφελεύμενος ἥδεται καὶ οὐδὲν σίνεται τὸν τροχίλον*.*

Fourthly, as to the polite understanding which Mr. Wilkinson presumes, this may appear strange to a person only acquainted with wild animals as seen in showmen's caravans and menageries, but not to those who have studied their habits in their native haunts. The facts relating to this subject are worthy of more consideration than I can give them, without deviating from my present purpose; I will therefore only add, that I believe the common Paddy bird of Bengal to be the Trochilus of Herodotus, or a bird of the same genus. Now both Europeans and Bengallees agree in asserting, that this bird is constantly seen standing on the head of the Crocodile, and though I never heard any one assert that he saw it in the act of picking his teeth for him; I think it will be admitted that the visit is not without an object.

I am, dear Sir,
Yours very truly,
W. C. Hurry.

Cossipore,
September, 1839.

Art. VI.—*Documents relative to the application of Camel Draught to Carriages; communicated by* C. B. Greenlaw, Esq., *Secretary to the Bengal Steam Committee.*

At a period when the applications of steam to locomotive purposes absorb the attention of the civilized communities of the world, it may seem almost too late to propose new directions of animal power to this object. The copious extracts we now publish from the documents of the "Steam Committee" and of other authorities, will place the subject in a different light. We willingly devote our pages to its consideration, in the conviction of its great value to all classes of Indian Society.

The discovery of the applicability of the Camel to the draught of carriages of every kind, we regard as one of surpassing value to countries of the peculiar climate, and in the still more peculiar social state in which India and Egypt exist, and through which for more than one generation they must slowly and almost insensibly advance.

* Herod. Euterpe. clxviii.

To Major Davidson, of the Bengal Engineers, we believe must be assigned the signal credit of having first demonstrated the practicability of using the Camel for carriage draught. Some years have elapsed, since Major Davidson exhibited a Camel harnessed to a light car, on which he travelled at the rate of eleven to fourteen miles an hour, and executed daily stages of thirty-six miles for several days in succession. Encouraged by this example, Mr. Bird, of Allahabad, constructed the carriage of which we publish a striking sketch and plan, and in which he has accomplished the tours described by Mr. Taylor, in his note published in the present series of documents; for the illustrations we are indebted to the kindness of the Hon. Mr. William Wilberforce Bird, of Calcutta.

In a subsequent number we hope to be enabled to publish interesting details regarding the Camel Artillery organized by Major Pew, and which, throughout the whole of the trying march on Cabul, has given such perfect satisfaction to the projectors of this important addition to our military resources. Meanwhile, the papers we subjoin, afford copious information on the practical points to be considered in attempting to introduce this system on the great line of communication through Egypt and in India. Under the auspices of the British Consulate, and the direction of Mr. Walne, we are sanguine as to the early success of the attempt to establish across the isthmus of Suez a train of vehicles in celerity only inferior to the steam vans, of which the Camel is the certain precursor.—EDS.

Extracts from a letter to CAPTAIN BARBER *from* ALFRED WALNE, ESQ., *Vice-Consul in Cairo.*

Her Majesty's Vice-Consulate, Cairo, 17th March, 1839.

[*Comparative expenses of Horse and Camel draught in Egypt.*]

I question altogether the feasibility of finding persons in Egypt willing and able to contract for a supply of one hundred and twenty horses, to drag the ten vans, which are for the carriage of coals to Suez, and of goods from that place. But supposing even that persons were ready to come forward with the capital, it would be impossible for them to find here horses suitable for such an undertaking. The horses of Egypt, as experience has proved, are not in the least calculated for draught, and not at all accustomed to it; and even if they were, the wear and tear in this climate, more particularly in the deserts,

would lead to a constant and serious loss. Supposing however that the horses are provided, *and it is only England that can supply them*, we must calculate the annual cost, compared with the work they can perform, and again with that of Camels, which, whatever may be the opinion in Europe, are the best, because the natural means of conveyance for a desert road. Premising that the following calculations are only approximative, inasmuch as the price of provisions varies considerably from year to year, I proceed to offer you the following details of expense.

120 horses, being constantly employed for three hundred days of the year, will consume $1\frac{1}{2}$ roobs of barley per diem; in all 54,000 roobs, or 2,250 ardebs, of which the price has varied in the last two years from p. 30 to 65, and even more. Taking it at the calculation of p. 40 we have this result, 2,250×40 p. 90,000. Four-fifths of this being for the stables in the desert, or for those in Suez, will require carriage, which, taking the long and short distances into full consideration, cannot be computed as averaging less than p. 15 the ardeb, or 1,800×15= p. 27,000.

It is calculated that with the above supply of corn, each horse will require *per diem* 4 okes of cut straw (tibne), which, purchased with the greatest advantage, will, at the Government price, cost 4 paras the oke. Thus 120×4=480×4=1,920, or paras 48 per diem—48×300= paras. 14,400.—

Of the 120 horses, 96 would naturally be either in the desert or at Suez, and it would be necessary to carry their supplies to those places; now, though heavy *Belladee* Camels may carry 200 okes of tibne, it is fair to calculate that three of the Bedouin Camels will not take more than 384 okes, or the day's supply. Thus 3×30= p. 90×300= p. 27,000, as expense of carriage.

Forty-eight, or $\frac{2}{5}$ of the horses being at Suez, or near the Nile, may be supplied with water at an expense which need not enter into calculation; but seventy-two, or $\frac{3}{5}$, being in the desert, will require (unless boring or other means should supply new sources) that water should be conveyed to them. Allowing for a little wastage, but on the other hand using the most serviceable (cow) skins, each horse will require a quarter of a Camel-load a day. Thus 18×30= 540×300= p. 1,62,000.

It is indispensable that horses in this climate should be turned out, say for sixty-five days, to *Berseem* or clover. Each horse is allowed half a feddan, and taking it at about the cost of the present year, p. 400 (which happens to be unusually low) we have 60×400=

p. 24,000, to which we must add the expense of *rafeeahs* or guards, six of which, in addition to the ordinary attendants, will suffice to protect the animals from robbery. Estimating each at p. 100=100×6= p. 600.

For the management of the five stables there would be required one Nazir, or a general Superintendent, at p. 300 a month, five chief Saises, resident at the several stations, at p. 100; and ten stable assistants, at p. 60 each. In addition to these, I calculate that each set of four horses would require one good groom, to be always with them; and as much of his time must be passed in the desert, the monthly wages of each cannot be estimated at less than p. 80. The total annual expense for these men will be p. 38,400.

The horses will require shoeing at least once in 30 working days, and supposing that this is done by contract, each set of *shoes* (Arab) will cost p. 6. Thus 120×6= p. 720 a month, or in the year, p. 7,200.

To meet veterinary, and minor charges, I add p. 2,200.

Summary.

		paras.
	Cost of 2,250 ardebs of Barley at p. 40, ...	90,000
	Carriage of $\frac{4}{5}$ of do to Suez and other stations, ...	27,000
	Cost of cut straw (tibne,)...	14,400
	Carriage of $\frac{4}{5}$ of do. to Suez and other stations, ...	27,000
	Carriage of water for 72 horses to do.	1,62,000
60	Feddans Berseem, ...	24,000
6	Rafeeahs or guards, 65 days, ...	600
1	Nazir, or general Superintendent of horses, at p. 300 a month, ...	3,600
5	Superintendent *Saises* at p. 100 do.	6,000
30	Grooms, or *Saises*, p. 80 do.	28,800
10	Stable Assistants, p. 60 do.	7,200
	Shoeing 120 horses, at p. 6 each, ...	7,200
	Veterinary and minor expenses, say, ...	2,200
		4,00,000

In the above calculation, nothing is put down for the wages of English carters—the wear and tear in harness and stable gear—the expense of water skins, which must be very great—the interest on outlay—or the loss in cattle.

But we may now calculate what work can be done with 120 horses, kept at an annual expense of p. 4,00,000. It has been already observed, that the animals are available for only about ten months of the

year; and I consider, that, with due allowance for rest, each set of twelve horses can make only one journey to Suez and back in ten days; in other words, thirty vans might proceed to that place and return every month, for ten months of the year. In the estimate it is stated, that each van will convey 15 tons admeasurement, the heaviest horses, however, would have great difficulty in dragging forty sacks of coal, or five tons, weight;—thus 5×30=150×10=1,500 tons in the year; supposing even that there were 1,500 tons of goods to return from Suez, the expense per ton, merely reckoning the keep of and attendance on the horses, would be each way p. 133 $\frac{13}{40}$, more in fact than that of Bedouin Camel-hire for the same amount; coals being now sent to Suez for p. 132, and goods returning from there, at from p. 80 to 100.

Much misunderstanding appears to exist as to the nature of the Suez road, which will be found on examination to be by no means adapted to heavy waggons, although there is nothing to interfere materially with the transit of light carriages; always excepting the expense of horses, in a climate in which they cannot do half the work that they would in Europe. The first part of the road, for about ten miles, is in reality a deep sand, which would require very broad wheels to pass over; the rest is, with a few exceptions of sandy intervals, a tolerably compact gravel. I should suppose much of the road would be cut up by only a few months passage of heavy vehicles, and that with little or no chance of repair, so far as the Egyptian authorities are concerned. The want of water on the road adds enormously to the expense of transit where any other animals than Camels are used, and though it is possible, but from the geological formation not very *probable*, that boring may succeed on some points; it must not be forgotten that experiments have already been made, (see Transactions of Geographical Society) and without any permanently useful result. In Mr. Holme's Report, pp. 121-122, this matter is however treated very lightly. Mr. H. says, "another objection has been made, that there is no water between Cairo and Suez; if this had to be carried, as it now is, for the supply of the cattle, &c. it would amount to a small addition in the cost of transit, that is all; but it can be shown from analogy that good water could be found by boring at any point on *this* line, and at about depth; and were this not the case, or did it present a greater difficulty, 25,000*l.* or 26,000*l.* would lay down a pipe, the whole distance; and consequently provide a *self-acting supply* from the Nile at any point where a plug might be fixed." Mr. H. writing at a distance from this country, seems not to have been aware that the principal level of the desert is more than sixty feet above the surface of the Nile, during the period of

inundation, and that several parts of the road are *still* higher. However convenient therefore this self-acting supply may appear on paper, we who are on the spot know very well, that the expense would not by any means be confined to so many miles of iron pipe, but that to raise the water to the requisite height, there would be a considerable outlay for a steam engine, raised tank, &c., &c. in addition to which there is nothing to prevent the pipe being injured or destroyed in any part of the road, whenever the Bedouins should wish to impede the carriage transit, on which they cannot look *with* very favourable eyes, depriving them, as it would do in great measure, of the means of existence. Reflecting upon the subject of transit across the isthmus, I cannot too strongly urge on you the necessity of abandoning the van scheme, so far at least as the carriage of coal and heavy goods is concerned. Till such time as enterprise may have re-opened the ancient canal, or laid down a rail road, I would advise you to use the means which this country places at your disposal. Should the demands of the Egyptian Government, as I think is very probable, *so* far engross the Bedouin Camels as to prevent your hiring a sufficient supply, it will I believe be in your power to find persons in Egypt ready to purchase, keep, and furnish by contract, a sufficient number of heavy Camels, to carry across any quantity of coal you may require, at about the present cost, as estimated in my report. The following sketch will however shew, approximatively, what would be the expense to a Company, keeping its own animals, in order to have a regular and certain supply entirely at its own disposal.

Three hundred heavy camels, to be kept in good condition, will require, at the rate of a roob each, 300 roobs of beans daily, or say 300 days of the year, or 3,750 ardebs. The variation of prices has been so great in the last few years, that it is difficult to estimate the average, but I put it down as double the cost of barley, which I reckoned at p. 40 the ardeb, 3,750×80 p. 300,000.

Taking into calculation, that when crossing the desert Camels brouse by preference on the prickly plants and shrubs which abound along the whole line of road, I estimate the quantity that will be required of cut straw *(tibne)* at 600,000 okes, which, at 4 paras the oke, will cost p. 60,000. Each animal carries his own provisions, so that there is no extra expense upon this head, as in the case of horses.

For the above number of Camels at the rate of $\frac{2}{3}$ a fedden each, 200 feddens of Berseem will be required, which at p. 400 will cost p. 80,000. During sixty-five days, 10 *rafeeahs* or guards must be employed, at p. 100 each, 10×100 p. 1,000.

To take charge of the Camels I allow one *Nazir*, or general superintendent, at p. 300 a month; 3 *mukuddems* at p. 100 each; and 60 Camel men at p. 60—making an annual outlay in wages, of p. 50,400, to which must be added two men to mend the saddles, &c., at p. 70, or for the year, p. 1,680.

Summary.

	paras,
Cost of 3,750 ardebs of beans, at p. 80, ...	300,000
Do. Tibne, ...	60,000
Do. 200 feddens of Berseem, at p. 400, ...	80,000
10 *Rafeeahs*, (guards) at p. 100, ...	1,000
1 Nazir, at p. 300 a month, ...	3,600
3 Makuddems, at p. 100 do.	3,600
60 Camel men, at p. 60 do.	43,200
Veterinary and incidental expenses, say, ...	4,600
	496,000

Not to overwork the Camels, I should allow ten days for the journey to Suez and back again, the animals being loaded each way, and carrying a quarter of a ton each. In the three trips per month, they would convey 250 tons of coal to Suez, and working only 300 days of the year, would place at the depôt there 2,500 tons, being available to bring back a similar weight of goods from Suez. Calculating the carriage of the former at p. 132 the ton, the latter would be about p. $73\frac{18}{40}$.

The great advantage in an establishment of this kind would be the regularity with which the coals might be transmitted to Suez; and as the departure and arrival of the caravans would be entirely subject to the Company's arrangements, all the packages landed from the steamer at Suez, might be immediately brought across the desert, and proceed without loss of time to their destination.

Any one who has long resided in this country, and has had opportunities of comparing the relative cost and utility of Horses and Camels; will have no hesitation in deciding in favor of the latter. The Camel is a most hardy animal, carries its supply of water in its stomach and its beans upon its back, browses on prickly shrubs no other animal can touch, and does not ever require a shade or covering to its resting place. These are qualities which even the English horse most certainly does not possess, and if ever the communication between Cairo and Suez is to be made by vans, it is the Camel and not the horse, or even the mule, that must be harnessed to them.

In the event of a Company requiring a Camel establishment of their own, the agents must not be allowed to purchase the village Camels that are to be found in the neighbourhood of Cairo. Such animals, although very heavy, appear to have lost somewhat of their natural habitudes, and to be less fitted for the desert than those of the Bedouin breed. It would be necessary to send persons of competent knowledge to the Bisharee desert or the Sennaar, where Camels are good, plentiful, and cheap. Some losses in bringing them down would be unavoidable, and it is but safe to calculate a good stud of well chosen, strong, heavy Camels as averaging not less than 15*l.* a head.

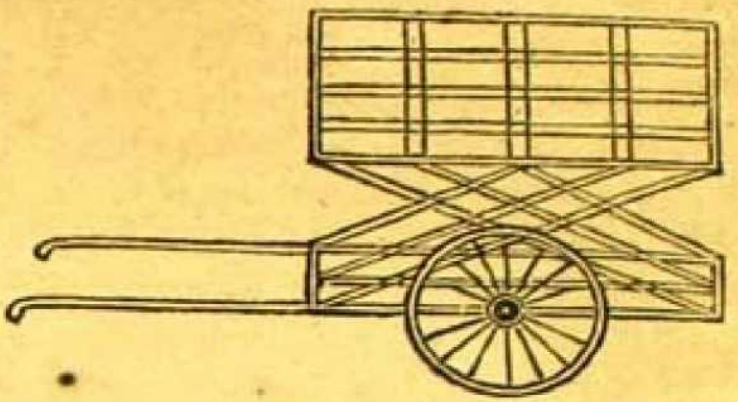
(*Signed*) ALFRED S. WALNE.

Memorandum on Camel Draught and Harness. By Captain TAYLOR, *late Agent for Post Office Inquiries.*

The recent discovery of the efficiency of the Camel in draught, is a point of singular moment in respect to overland communication. Mr. Bird, the able and intelligent senior member of the Board of Revenue at Allahabad, has recently made the tour of Upper India in a carriage drawn by two, three, or four Camels, as circumstances rendered their power necessary. The more usual number in harness, was three. The carriage was a light britska on four wheels, each of five feet diameter, with a dickey fore and aft, and a well for baggage. The carriage conveyed Mr. Bird and his lady, and four servants, and baggage consisting of beds, tables, portable chairs, crockery, cooking utensils, wines, &c., and clothes, writing apparatus, and official documents. They travelled at from thirty-six to forty miles per day, going half the above distance in the morning, and half in the afternoon. Either half was usually performed in from three to four hours; the pace averaging about six miles per hour, when the road was good; and about four and a half, or five miles per hour, when the road was indifferent. In deep sand, the pace would of course be less; but in sand, such as the desert is represented between Suez and Cairo, I should think five miles per hour might be easily obtained. I made some experiments myself while in Upper India, in respect to the Camel in draught, which I here take the opportunity to mention.

First, in respect to conveyance of baggage. Secondly, in respect to conveyance of men.

A small frame composed of strong bamboos was placed on a pair of wheels, and balanced much in the same manner as the ekkas in the North-West Provinces. On this was placed a large stout tin box,



in a wooden frame, four feet square by two and a half high. A Camel was then brought, equipped just as a common Huckaree Camel, but having a small loop on either side of the saddle, into which the hook of the shafts was passed. The Camel was mounted, and in lieu of putting baggage into the van, we put four men and started it. The Camel moved away with it at the rate of full six and a half miles an hour, and trotted gaily all round the stony and uneven surface of a large compound. We then proceeded some distance along the road, and the Camel van was found to answer admirably.

The next day we tried a four wheel conveyance for passengers. It was a light carriage, something between a palanquin carriage and a double bodied coach, with rattan-work blinds, which let up and down, and excluded the glare, while they let in the breeze. It had a small dickey in front, and afforded excellent accommodation for two persons and their servants, and a couple of carpet bags, and minor &cs. To this we harnessed two Camels, the pole being attached to one side of each saddle, and a bamboo trace being fastened to the other side. The Camels were mounted, and Dr. Ranken—the ingenious inventor, and prime mover of the whole—and myself being seated inside, and a servant on the dickey, we started, and drove half round the city walls of Delhi, then entered the gate and drove through the Chandrichouk, to the no small surprise of the natives: our pace being somewhat more than seven miles an hour. We returned home after a drive of some six or seven miles. The next evening a second experiment was made. Three miles were measured from the Cashmere gate. The road was mostly good and smooth, but by no means level, the load about thirty stone; the carriage started, and completed the entire three miles out, and three miles back, total six miles, in thirty-eight minutes;—nine and a half miles per hour.

Again I left Delhi en route to Allyghur, and after crossing the river, started in the above mentioned carriage with two Camels for Dadree, distant twenty-two miles. The first eighteen miles were certainly as rough a road as I ever remember to have passed in a wheel conveyance, and in places indeed was so bad, that I was compelled to quit the road, and drive through the fields. The last four miles were good. The whole distance was performed in four hours and twenty minutes,

including a detention of about ten minutes in crossing the Hindon river.

When the Camel's temper, docility, strength, and capacity to endure thirst, are considered, it must be obvious that no mode of crossing the desert could be discovered, equal to that of a Camel carriage.

The best description of carriage for the purpose, would probably be something between a britska and a cab phaeton, made as light as possible, with hood that will let down or close up entirely, and with dickies for servants before and behind, and room in the body, or under the dickies, for clothes and other baggage. On a good road such carriage should of course be made with steel springs, but for crossing rough roads, I should think, that long springs of buffalo leather, like those used for the Caracollas in the Havannah, described in Alexander's travels, would answer well. The wheels should be all of the same size, and five feet in diameter. I should think that carriages of the sort required, might be built both cheaper and better in India than in Europe. Calcutta built carriages are usually lighter than those imported, and the wheels are especially much lighter, and certainly stand the climate better. I have reason to believe that for 1,500 or 1,600 rupees, a carriage of the above description, every way efficient, may be built in Calcutta.

Three Camels per stage would be ample for such carriage, to take two passengers, their servants, and light baggage; and the distance from Suez to Cairo being under eighty miles, four stages would suffice. Three relays would be necessary, and the journey might then be performed with safety and ease in twelve hours. These relays might be sent forward from Suez, when the steamer was first signalized, and would then be ready to take forward the carriage, when the traveller reached the relay station.

The Camel draws with perfect ease, and requires but little training. His pace is a long walk, or a long trot, and there is no unpleasant motion of any sort imparted to the carriage by his movement. It is not generally advisable to take a Camel in draught a longer stage than twenty miles, as when over-worked they are apt to lie down, and will not move; an unpleasant proceeding in mid-stage. But for eighteen miles they will trot readily and well. Camels for draught should be highly fed, and it is a good plan, at the expiration of a stage, to give them half a seer of ghee; this if laid out in skins, they will lap up at once, and will then readily eat their grain or fodder; but otherwise, they will sometimes be off their food; and it cannot be too strongly impressed on all who employ the Camel in draught, that good feeding is a *sine quâ non* to ensure its efficiency.

The Camel men generally have a prejudice against employing Camels in draught. They say that the Camel was never intended to draw, but to carry, and look upon it as little less than a sin to put the animal into harness. They have further a prejudice, that it will kill the Camel: this is altogether fallacious. On a plain, the Camel draws with extraordinary ease, and a single Camel is fully equal to two and a half horses. It is not however so easy to combine Camel labour, as it is that of horses, i. e., it is less easy to make them pull quite steadily together; and four Camels are not equivalent to ten horses; I should estimate their power rather that of seven or eight horses. They do not draw very well up hill.

In India, the Rewarree Camels draw with the least training, because they are accustomed, in their own country, to draw the plough; and I should think the Egyptian Dromedary would draw equally well, for I think I remember to have read in some book of travels, that in Upper Egypt they are occasionally harnessed to the ferry boats.

The carriage should be built as light as is consistent with the union of strength and comfort, for it is far preferable to have a light carriage drawn by two Camels, than to have a heavy carriage with four Camels.

The Camel will draw a buggy well, but the buggy should be so balanced, like the ekkas, that but little weight may rest on the animal; and it must be borne in mind, that in consequence of the Camel's height, the shafts must necessarily have a considerable inclination upwards.

The bridle and saddle required for the Camel in draught, are precisely the same as those used for the common Sandees or Hurkaruh Camels of Upper India. On each side of the saddle however, and a little behind the legs of the rider, is an iron ring into which the hooks of the traces are looped. Around the neck of a Camel is a sort of breast-plate of broad tape or rope, which serves to keep the saddle steady in its position.

The traces are of male bamboo, with a hook at one end to hook into the ring on the saddle, and on the other a loop, like those of a leathern trace, to loop on to the carriage.

The Camels are harnessed in pairs. There is a pole like that used for horses, but its position is more upright, and which is buckled to the saddle, as it would be to the harness of a horse.

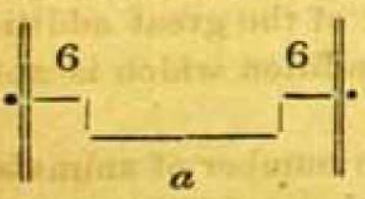
When four Camels, or three Camels are used, splinter bars are put on the top of the pole, and the front Camels are harnessed to them by traces in the same manner as the wheel Camels. Each Camel has a separate rider.

T. J. TAYLOR.

CALCUTTA, *April 15th*, 1839.

Extracts from Mr. WALNE'S *letter of 15th June, 1839.—Dromedary Carriages.*

I now proceed to the question of Dromedary carriages. My attention has for sometime been seriously turned to this subject, and though observation has quite convinced me that the Camel is a most useful animal for draught, and may be turned to great account in taking across the desert trucks loaded with coals, and other heavy articles, I have hitherto felt rather less sanguine as to adapting Dromedaries (i. e. light Camels) to vehicles calculated to combine comfort with expedition. The difficulty attaches principally to the carriage, and the peculiar road over which it has to pass, and is one, after all, which will doubtless be overcome by the ingenuity of the coach maker. Though a considerable portion of the Suez desert is a hard gravelly plain, there are here and there broad bands of deep sand, over which an ordinary carriage cannot readily pass, whilst in other spots the road is so strong and rough as to defy the best springs, and put ease out of the question. It is, in short, as nature has made it; and though art may do something to improve its condition, this line can never acquire the properties of a good carriage road. To overcome these obstacles it is necessary that the wheels should have a much greater diameter than those usually employed, and in my proposals forwarded by the last steamer to the Honorable Court of Directors, I suggested, for the conveyance of coals a truck, or cart, with two wheels of nine feet diameter, the weight being suspended from the axle, and the pole resting by a bar on the necks of two Camels. A carriage however for the conveyance of passengers, obviously requires four wheels, and as their diameter must be not less than six feet, and should if possible be more, the whole vehicle will be apt to acquire rather an unwieldy form. The height however of the body from the ground may be diminished (though a little at the expense of strength) by giving a dip or bend *a* to the axles



which, as well as the wheels, must be of wrought iron, and by placing the suspension (not curricle) springs at the sides, 6 6. The pole must be adapted not only to the height of Dromedaries as they stand, but also to their habit of occasionally lying down, and the draught be on the hump and ribs of the animals, the harness being similar to that of Major Pew's Artillery. The body should of course be as light as is consistent with the requisite strength, have good arrangements for ventilation, and might contain comfortable sitting room for eight persons, four inside, and two in a cabriolet division at either end. For a carriage of this kind, four Dromedaries will be necessary, and the journey being divided into four stages, each ve-

hicle will require 16 animals. Taking the calculation at 13 carriages and 208 Dromedaries, the following will be the annual expense of the latter, reckoning beans at p. 60 the ardeb.

2,600 ardebs of beans, at 60, ...	p.	156,000	
374,400 Okes cut straw, ...	,,	37,440	
104 Feddans Berseem,...	41,600		
Rafeeahs, ...	1,000		
	,,	42,600	
52 Boys, at 35 p. month, ...	,,	22,560	
20 Men, at 60 ditto, ...	,,	15,120	
1 Nazir, at 300,...	,,	3,600	
Incidental expenses, say, ...	,,	2,680	
		280,000	£ 2,800

To render the Dromedaries serviceable for bringing passengers from Suez, as well as conveying them to that place, it is requisite to add 52 Dromedaries (increasing the annual expense one fourth,) to be placed at the Suez station, at the same time doubling the number of carriages. The latter would, at each end of the journey, await the arrival of the following steamer, but for the intermediate time the animals should be withdrawn from the stations to the neighbourhood of Cairo, where alone they could be fed with economy, and be properly looked after.

For both mules and dromedaries there must be some expense attending the carriage of beans to Suez, and there may also be an occasional outlay for water at the stations in the desert. In the event of the former being employed, each mule would, on ordinary occasions, carry a bag of beans and a small *girbeh* of water, sufficient for the 30 hours passed in the desert; and if carriages be adopted, the dromedaries sent forward for relays will take with them a quantity of beans and straw sufficient for the journey. In either case the detention of the animals at Suez should be as short as possible, not only on account of the great additional expense of feeding them there, but the bad condition which is apt to result from the continued use of brackish water.

In the above estimates I have only calculated the number of animals, whether mules or dromedaries, required for the transit of 100 passengers, but I need not observe that to provide for casualties a larger establishment would be required. The clover season too, in which the whole stud must be turned out, will give rise to some inconvenience, that must be anticipated and provided for.

It will have been seen, by a comparison of the two estimates, that in the annual expense of keeping mules for sedans, and dromedaries for

carriages, there is no very material difference. The speed will, I consider be nearly equal, and I question if in either mode the actual journey be in general performed in less than eighteen hours. Even in carriages I presume the travellers, particularly ladies, would gladly avail themselves of ten or twelve hours rest at the stations, and as the departure of the steamer must be regulated by the arrival of the cargo and baggage, no advantage would be gained by compelling passengers to hurry through a journey, that must, under the most favourable circumstances, be sufficiently fatiguing. As however the advantages and disadvantages of either scheme can only be judged of by experience, the best advice I can give the Committee is to direct comparative experiments on the *actual road*, to be made and reported on a rough carriage, that might afterwards serve as a break; and a sedan frame, four dromedaries and two mules, are all that would be required, and a series of trials made for a few weeks, and at a trifling outlay, would set the question at rest, and enable the Committee to adopt a plan that need not entail the expense of subsequent alterations.

The freight of coal from Alexandria to Cairo is, in native boats, 6 a ton, and the landing, stowing, and subsequent transfer to the steamer, will cost about one more. The latter charge is the mere cost of Arab labour, and is distinct from the annual expense of a clerk, weigher, gate-keepers, &c., which, with proper management, might be serviceable in the baggage and cargo department, as well as in the coal depôt, provided the latter be limited to the supply of the Nile steamers. In the event however of there being a depôt, on a large scale, connected with the transfer of coals to Suez, the establishment should be entirely separate.

If by employing large steamers coaled at Aden, the depôt at Suez can be dispensed with, doubtless there will be a great advantage to the Company in such an arrangement. The business of the Egyptian Agency, already sufficiently comprehensive, will be proportionately lighter, and probably a great annual expense will be avoided.

In my letter to Mr. Greenlaw, dated 17th December, I offered an estimate of the expense of delivering coal, which was at that time from Alexandria to Suez about 2*l.* a ton. A recent rise in Camel hire has added nearly 10 per cent. to the cost as then calculated; so that the carriage of coals by hired Camels, particularly where so large a quantity as 10,000 tons is required, has less to recommend it than formerly. An immense saving may however be effected by the adoption of the Camel suspension truck, to which I have already alluded, and I calculate that coal may be put on board at Suez for about 1*l.* 13*s.*, exclusive of the cost of delivery by contract (at present 2*l.*,) at Alexandria. The

plans and estimates connected with this subject are now before the Honorable Court of Directors, and I leave it to the Committee to use their influence, in obtaining from that source, the information I have communicated, and which is I believe of sufficient interest to merit their attention.

(Signed) ALFRED S. WALNE.

Her Majesty's Vice-Consulate, Cairo, 5th July, 1839.

Sir,—I have the honor to acknowledge receipt of your letter of the 29th April, containing copy of a paper on Camel carriages, communicated by Mr. T. J. Taylor to the Committee of the New Bengal Steam Fund.

In my letter to Capt. Barber, of which the above is a copy, I have entered somewhat at length into the question of Dromedary carriages, and before the departure of the next English Steamer, I shall, in compliance with your request, send him a few observations on Mr. Taylor's excellent paper, the perusal of which has interested me much, and afforded me some hints that may prove extremely useful.

I am sorry that I cannot forward you a copy of my proposals for the carriage of coals, in high wheeled carts, drawn by Camels; but having caused them to be laid before the Court of Directors, I thought it best to limit myself to advising Capt. Barber as to the source from which he could obtain the information I had furnished.

I was enabled to obtain from Capt. Graham, who accompanied the elephants to Cairo, a general idea of Major Pew's Camel Artillery, but if the Committee would do me the favor to furnish me with a sketch of the harness in detail, I should feel particularly obliged.

(Signed) ALFRED S. WALNE.

C. B. Greenlaw, Esq.
Sec. N. B. S. Fund.

ART. VII.—*Account of a Journey from Sumbulpúr to Mednipúr, through the Forests of Orissa. By* LIEUT. M. KITTOE.

(*Continued from page* 480.)

May 28th. I resumed my march at half-past 2 A. M.; the morning was very clear, and sufficiently light for me to see as much as was necessary after my observations the previous evening.

I had almost forgotten to mention, that yesterday evening a very intelligent person from Lehra had given me a good deal of information, which, if quite correct, would be very valuable. Having learnt from me the ghat I was proceeding to in the Keunjur hills, he told me that I had come much too far south, that I ought to have continued due east from Sonamoonda, where I had turned southward, and have crossed the river at Barakôt, a place at the foot of the hills between which it flows by a very narrow pass, and that from thence to the mountain chain, the path was direct and tolerably good; he added, that it led to a pass that had not yet been examined, and which is in a very good direction.

In consequence of this information I determined to regain the proper line by avoiding Lehra, and proceeding direct to a place called Goorsunk, distant fourteen and a quarter miles. On first starting I went through the village and then descended into the bed of the river, which I crossed in a direction slightly diagonal, passing over several islands; the distance across was half a mile. The gravel in the river's bed consists chiefly of granite, gneiss, quartz, and much jasper of variegated colors. I could not discover the slightest trace of coal, so that I feel the more positive of the correctness of a former conjecture of mine, that the coal measures are confined to the country below the gneiss and granite formation, extending along the northern boundary of Tálcher, Ungool, and Rehrakôl.

Having reached the opposite bank I travelled in a north-easterly direction over tracts of very rich soil, with an equal proportion of jungle and cultivation, till I reached a large village amidst beautiful mango topes, called Hunnaum, distant one and a quarter miles from Barsing; from hence to another respectable place called Bumpúra, nine miles further on. I passed through a thin forest of saul with occasional patches of cultivation, the path inclining more to the eastward than before; the soil is exceedingly rich, consequently the heavy rain of the previous evening had rendered the road very muddy and difficult to travel over; in this there was one advantage, for it shewed the necessity of metalling, should the road pass this way. It is really lamentable to see such fine lands left uncultivated.

Three miles and seven furlongs beyond Bumpúra, I reached my encamping ground at Goorsunk; most of the huts in the village were falling to ruins, one third of the population having perished from famine and cholera the previous year; it is situated at the entrance of a narrow pass between two low ranges of hills, and is surrounded with fine topes, in one of which I spread my carpets and made myself snug for the day.

While passing through the forest a peculiar sound attracted my attention, it was like that of a wooden ball dropped on a board and allowed to vibrate; I at first thought it might be a woodpecker, as it proceeded from the top of a lofty and withered tree, but upon inquiry I was told that it was a kind of frog which inhabited the trees (the tree frog?) and that its call was a sure harbinger of rain;* it is considered venomous, indeed that its bite is certain death. I regret that I could not obtain a specimen; its color is said to be dark with white spots. At this place I remarked a number of stones placed in the same manner as the druidical monuments (such as the Kitscotty house near Boxley in Kent) viz., three set upright, with one on the top of them, the dimensions of these are however very small, and have the appearance of a number of three legged stools. A custom prevails in these parts, of relatives collecting the ashes and bones of the deceased, and after burying them, placing stones over the spots in the manner above described.

Before my arrival the male part of the small population had fled to the jungles, leaving their better halves to protect themselves and property as they best could. It is a common practice throughout these provinces; the instant strangers are perceived, off the people run (as if their lives were at stake) and are hid in the depths of the jungle in a moment,—it is to facilitate their escape that the jungle is never entirely cleared near the villages; a narrow belt connected with the forest is usually to be found. I forbade my followers leaving camp in order to prevent pilfering; the villagers returned towards the afternoon, and crowded round me to see what description of being the Sahib was, never having beheld a white man before.

The view from Goorsunk is very confined, the place being situated in a hollow; to the eastward rise the Keunjur mountains over which I was to pass, they appear to be near 2,000 feet, and are thickly studded with trees. To the southward the Malagir mountain is distinctly visible above

* I have since heard many, and am inclined to think that these reptiles do not call except on the near approach of and during wet weather, as I have never heard them at any other time.—M. K.

the range of low hills; this mountain is reckoned the highest in Orissa; the people assert that there is frost ("pala") on its summit all the year round, and that the cold in the winter months is very great; the latter assertion I can easily credit, for it cannot be less than 4,000 feet above the level of the sea, perhaps more. I hope at some future period to be able to measure its height, and to learn more concerning it, for if all accounts be true, it would be a delightful and salubrious locality for the residence of any European functionary appointed to preside over these ill-governed and ill-fated states. There is a "gurh" or stockade on a shelf of land two-thirds of the way up the mountain on its northern face; there is said to be a fine tank and beautiful groves of orange* and other fruit trees; the position is considered very strong, and has for many years been resorted to as the place of refuge, (in case of attack) of the Lehrapal Zemindar. The estate of Lehra was formerly one of the eighteen dependencies of Sumbulpúr, as I have before said; but some years ago, the uncle of the present Zemindar willed his estate to the Keunjur Raja, or rather gave it to him as a dowry on the marriage of his daughter (an only child.) This questionable act has led, as may well be supposed, to continual feuds between the two powers, the Zemindar refusing to pay the homage required by the Keunjur Raja, and the latter refusing to accept the tribute (which amounts to 250 Rupees per annum) unless the former consents to attend once a year at the Keunjur durbar, and there present a nuzzur together with his tribute, dressed in woman's attire, i. e. a Sarí and Chúrís (bangles) on his arms, and in this condition prostrate himself at the Raja's feet. This the Lehra chief has from the first refused to do.

It is said that the former Rajas of Lehra used to hold their estate on this particular tenure from the Rajas of Sumbulpúr, but that the practice had long since been discontinued. Most of the minor "gurhs" were originally held on the like curious tenures, and some even still more absurd, for instance the adjacent state of Rehrakôl; the Zemindar used to perform (once a year) what was termed the "Muggur loth" or alligator's roll, when attending with his tribute on his lord (Sumbulpúr). The ceremony is thus described:—the Zemindar besmeared himself with mud, and when arrived within a stipulated distance he had to lie down and roll along the ground in that condition to the Raja's feet, which he saluted, his nuzzur was then accepted and he was allowed to rise.

In consequence of the above mentioned difference between the

* The states of Talcher, Rehrakôl, and Lehra are famous for oranges of a small size, but very sweet.

Lehra and Keunjur Rajas, the former sent two trustworthy persons to confer with me on the subject; I listened to their story, but as I had no power to interfere I declined giving any advice, except enjoining them to keep the peace, which I was informed the latter wished to disturb.

I learnt the following from the vakeels—the difference between the two states had existed for many years; at first Colonel Gilbert (the Governor General's Agent) visited Lehra to inquire into the case, he directed the Keunjur Raja to remove his paik thannas out of Lehra until the dispute between the parties was amicably adjusted; up to that period the tribute had been paid to Sumbulpúr, but since then the Lehra man had regularly offered it to him of Keunjur, who has invariably refused to receive it unless the former consents to perform the degrading ceremony.

The tribute has been regularly placed in the treasury of Lehra, and has consequently accumulated to some thousands of rupees, which the Zemindar said he was willing to pay either to Keunjur or to the British Government, but will sooner forfeit his life than humble himself as required;* the vakeels said that the Commissioner of Cuttack had refused to accept the tribute, and had ordered their master to submit to Keunjur, they added that they would do any thing I would order short of the degradation required.

This case shews perhaps the necessity of the political officers occasionally visiting the different mehauls; much good would result from it in various ways; but such is the multiplicity of duty which they are at present saddled with, that they have but barely time to attend to the more immediate and urgent duties of the country under our own regulations; added to which the stations of the two (present) authorities, viz. the Governor General's Agent, south-west frontier at Kishenpúr near Hazaribaug, and the Commissioner at Cuttack, are both upwards of one hundred miles removed.

Having dismissed the Lehra people, with promises that I would try and get the Keunjur Raja to come to amicable terms, (if I met him) also to speak to the Commissioner, I proceeded to give the Deogurh Mooktar his "rooksut" as I was now no longer in his district; he complained loudly of the extortions and oppressive conduct of some of the people who had attended on Capt. Abbott, and myself,

* In January of the present year when at Jotepur in Keunjur, I was informed that the Raja was preparing for an attack on Lehra, having erroneously supposed that Mr. B—. the Commissioner, sanctioned his so doing; and I was assured that my presence only had induced them to suspend hostilities which they intended to re-commence when I should have left.

I took down his deposition in writing and determined to report their conduct, which I did subsequently;* a further complaint was made of the oppressive conduct of one of the postmaster's jemadars, who had been extorting money, right and left, under false pretences of having been ordered to take the road first through one place then another; this individual had however lately been severely punished and discharged by Mr. B. who had heard of some of his pranks.

Being informed that the road in advance was very difficult and rugged, I thought it prudent not to push on in the evening as I had at first intended, so I passed the night at Goorsunk.

May 29th. Started this morning at half-past three and reached Tungoora at the top of the ghat at 10 A. M. after a most fatiguing march up and down hill for twelve and a half miles (by my perambulator) but by a previous measurement made by one of Mr. B——'s people it was much less,† the whole ascent being only 1,800 feet in all. This must however be an error, as the least, actual height of Tungoora above Goorsunk must be from 1,800 to 2,000 feet; the difference of atmosphere and of the range of the thermometer clearly indicates it; the latter was ten degrees below the range at Barsing and Goorsunk, and it must I should think be at least fifteen degrees below the usual range in the country below. The Malagir mountain (which is seen in all its grandeur from hence) appears to be considerably higher, therefore the thermometer at the hottest season ranges perhaps at six or eight degrees less still, which would make it a desirable spot for a sanatarium.

The road from Goorsunk as far as the village of Mandarah—six miles and a quarter—has a direction slightly northerly; there are many small watercourses and much uneven ground, also two large nullas over which rope bridges would be requisite, but it appeared to me that a much more favorable line could be laid down and innumerable windings avoided, also many watercourses. From Mandarah the bearing of the valley from which the ghats (viz. Tungoora and Muttíghattí) branch off is 60° south; I proceeded up the elevated ground in the centre of this valley, till a little beyond the village of Rungaree, at five miles and six furlongs I crossed a deep nulla and turning due north entered a narrow branch valley with a watercourse down its centre, at this spot the path to the Muttíghattí

* Major W—. I believe attempted to inquire into this matter, but was unable to gather the witnesses; these people would sacrifice any thing rather than leave their homes and venture before our cutcheries, however kind the European officer.

† I subsequently found that I had been led by another path the worst of all.

continued in a south-east direction. At seven miles and one furlong I reached the first perceptible ascent, and at nine miles and one furlong reached the top of the first ghat which was tolerably steep, much more so than necessary, as were the path to have an even ascent it would be less fatiguing, but at its best it would be difficult for wheeled carriages; the path runs along the edges of the watercourse, crossing occasionally from side to side, beyond this there is much gentle ascent over good ground; the second, third, and fourth ascents are very steep, but of no great duration, there are also several descents. If this ghat be adopted, the path must be judiciously managed so as to wind down by the edges of the watercourses; the greatest obstacle is the rocky nature of four out of five of the ascents, and of three-fourths of the whole distance; the stones could be thrown aside, but such as could not be removed could also scarcely be blasted, as the rock is of the hardest quartz and granite; they might perhaps be broken with sledge hammers and wedges.

Nature offers a capital hint for protecting the inclined surfaces of roads in the hilly tracts from being washed away and cut into furrows, and in many instances completely destroyed,—it is the effect produced by those trees which have fallen athwart the paths, likewise parallel to them; at these spots there are regular steps formed (as it were) and the intermediate spaces are quite level; whenever I have passed over undulating lands (which are as ten to one) I have observed that paths are less cut up and much better when there are fallen trees.

The hills have a superstratum of stiff red marl, and many are cultivated to the very peaks;* it has a lively appearance and bespeaks industry, for great labour must be bestowed in clearing these lands.

Tungoora is a large village surrounded with plantain gardens, it is in the Lehra zemindaree, and is supplied with good water from two strong springs flowing down both to the north and south sides of the hill, several hundred feet below. The view from hence is very grand but confined, owing to the trees.

The jungle on this morning's march was the same as usual, rather scanty but the trees very lofty, there are many wild mangoes along the ghat, the fruit is small and extremely acid.

The direction from the entrance of the ghat thus far, has been considerably north of east. Mr. B——'s road has never been surveyed, therefore the real direction is not known; I should not be surprised at

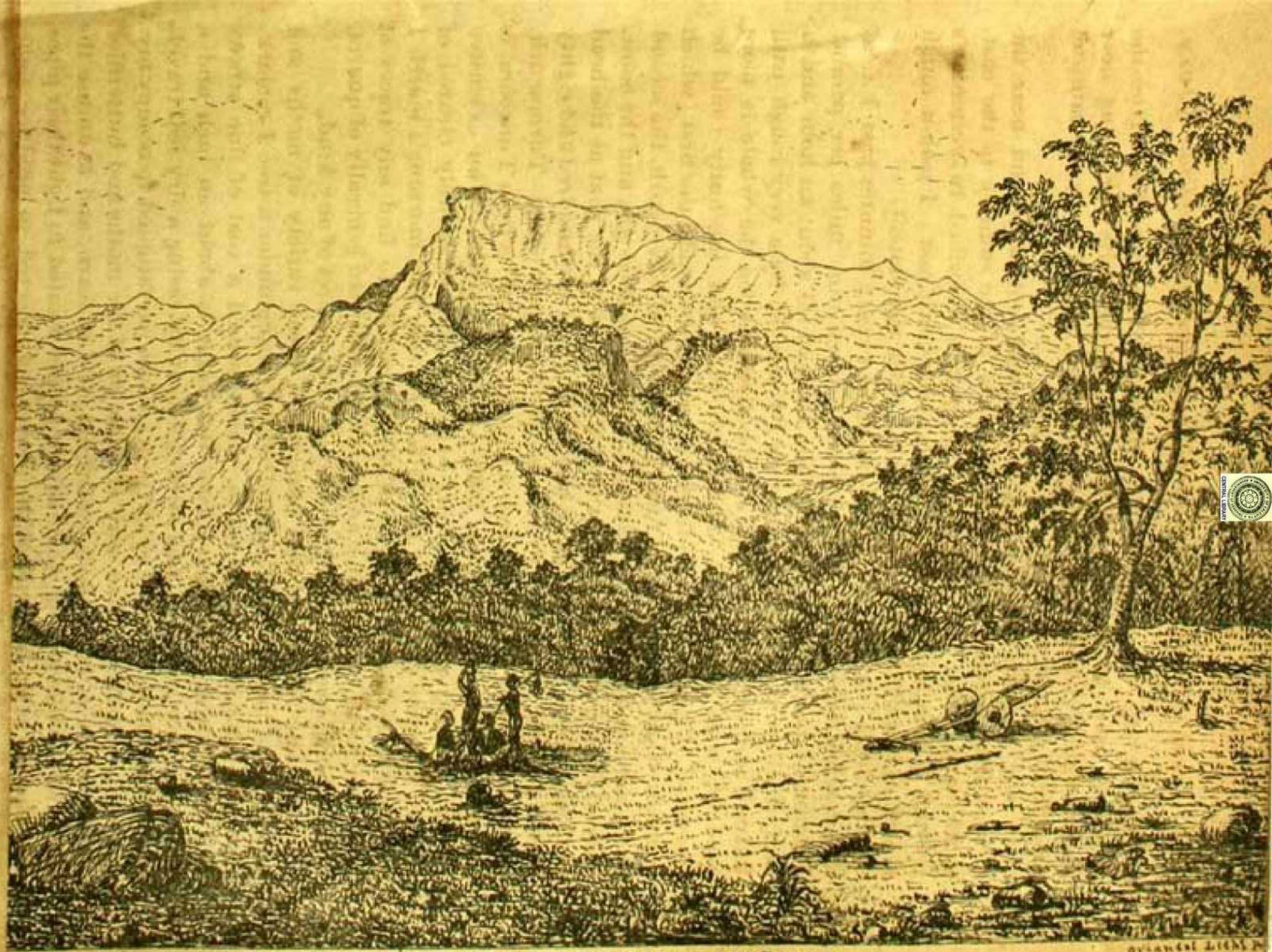
* From the specimens I have seen of the soils in which the tea plant grows, I should think these tracts would prove favorable to its cultivation, I have already described the climate.—M. K.

finding it the proper one from Byega to Terentee, I shall be the better pleased as there will then be no necessity for going near Keunjurgurh (which is far too much south,) and thereby all cause of discontent will be removed.

In the evening I ascended the highest spot of ground near the village, from whence I had a noble view of the country to the east, south, and west. The beautiful mountain described in yesterday's journal is seen in all its grandeur, bearing south-east ; I took a rough sketch of it and the country below it. [See the plate.]

May 30th. Marched this morning at twenty minutes past 1 A. M. and reached our ground at 7 o'clock, distance nine miles per perambulator. I halted three times on the road, in all about an hour and a half, to allow the palkee to come up ; I was led by a very rough path but not so much as yesterday, for the descent upon the whole is more gradual, with less jungle, and with care and ingenuity could be improved. I passed through three villages on the road ; the first (which is deserted) at four miles and forty yards is called Keeragurh, the second at six miles and one furlong, Sura,—this one is a good size, and the boundary of Keunjur and Lehra, it is at the bottom of the ghat at the head of a long valley. At eight miles one furlong and one hundred and eighty yards I came to a large village in Keunjur called Turmagurh, three-quarters of a mile beyond which, or nine miles from Tungoora, is the small village of Ballera, both are in the centre of an extensive valley (bearing east and west) which is almost entirely cleared of jungle, likewise several of the hills. During this morning's march I searched in vain in the beds of all the nullas to find any traces of limestone rocks, the pebbles and boulders consisted generally of quartz, sienite, hornblende, felspar, greenstone, but no ores of any kind.

I saw but few birds, but observed a great variety of moths and butterflies of beautiful colors, and while resting under a tree I remarked a peculiar kind of stick worm, which formed a coat of fine straws and small pieces of bamboo leaves, the worm is about an inch and a half long ; my attention was attracted to it by seeing a dry leaf travelling along, there were many of them ; I was too fatigued to occupy myself with collecting either any of these or of the moths and butterflies. There seems to be always something new to learn, and to amuse the traveller ; while resting, some of my people wanted to light their pipes, but there was no fire, one of the coolies volunteered to produce some, which he did by the following means :—the man searched for a piece of dry bamboo which he split in half, and with a piece of iron made a small hole in the centre of one of the joints on the inside, he then cut a small switch of a peculiar kind of pithy



VIEW OF THE MOUNTAIN OF MALACIR IN ORISSA, near LEHRAGUH.

shrub to a length of about a cubit, he pointed one end, then two men squatting down, one held down the joint of bamboo with his toes and both of them spun the switch rapidly and constantly round between their hands, the pointed end being put into the hole in the joint the friction soon produced a blind heat which charred both pieces of wood, and eventually they took fire, the operation occupying about two minutes or less.

In the vallies, the soil is the same as that of the ghat. I was obliged to halt at this short distance on account of its having commenced raining. This is certainly a delightful country and climate, if I may judge from present observation the soil is capable of any cultivation, and I should think that the tea plant would thrive, also coffee and cotton.* The thermometer fell to seventy-five degrees last night and did not range above ninety-two degrees in the daytime; it cleared up at noon and there was a fine breeze which I was told is constant there, the thermometer was only ninety degrees at noon. I took my abode this day in a cow-shed, on the floor of which I had some fresh earth thrown and levelled, it was by no means an uncomfortable place, indeed the cattle sheds are the largest and best built huts to be found in the villages, and in the hot or in wet weather they are far more comfortable than a tent in every respect, and twice as cool.

On my arrival this morning I met Mr. Babington's jemadar, who was to have shewn me the road over the ghats, which he had represented as so superior to all others that had been examined; after a little conversation I soon discovered what degree of trust was to be put in his assertions, he was a very well informed man, and had travelled through every nook and corner in the Keunjur country in search of a better road than the present one, but like most natives he had but a very poor idea of a straight line, or of the points of the compass; hence much of the trouble which Captain Abbott had to complain of.

I resumed my march at four P. M. and proceeded down the Turma valley towards the great hill under which, on its eastern base, is situated the gurh and town of Keunjur. I was aware that the direction was altogether wrong, but I was at the mercy of my guides and of the jemadar above mentioned; they confessed that there was a better road in the direction I wished to proceed by, but that supplies had been prepared for me along the route they were leading me by, which had (they said) only one or two slight ghats.

* I should think that no doubt could exist as to the favorable nature of the soil of these tracts for the cultivation of any kinds of superior cotton.—M. K.

After proceeding several miles down the valley, which inclines considerably to the southward, I entered a narrow glen with large forest trees, I here came upon the road Capt. Abbott had surveyed, very near to the village of Tillopussí, situated in another glen branching off to the westward, and leading to the Muttighat; I proceeded along this road towards the Byeturní river and valley, and reached the former long after dark, distance about six miles. Just as the evening was closing I fell in with a huge bear and her two-half grown cubs, I had no fire arms loaded, therefore we hallooed and drove her off, the cubs clung to her back much in the same manner as young monkeys do, only that they rolled about and did not seem to hold so well. It was fortunate I had many people with me, otherwise she would most probably have attacked me; these brutes are far more mischievous and dangerous than tigers, for out of pure mischief they maul people in the most frightful manner, particularly in the mango season when they frequently take possession of a garden, and defy all attempts of the villagers to drive them out.

Just before reaching the Byeturní, I passed a rather large village called Colesaie, inhabited by Coles, a number of whom have lately located themselves in these hills by the Raja's invitation, (it is said) with a view to employing these savages in ransacking Lehra whenever a fair opportunity may offer itself. I had some difficulty in procuring a guide from among these, for they refused to come, and seemed inclined to resist us,—we succeeded in catching one surly creature, whom we with much difficulty compelled to shew us the way. Having crossed the Byeturní (the Styx of the Hindus, which is here nothing but an insignificant rivulet thirty yards wide, with scarcely any water) I resolved on encamping for the night, for I could not trust my Cole guide, whom I dismissed;—we lighted fires in all directions and went to sleep.

I should here remark that the Byeturní takes its rise in the adjacent hills about eight or ten miles further south, and winds along under the hills in a northerly direction for many miles, entering Singhboom and then turning to the east for a short distance, when it finally flows towards the south through Keunjur and Dekkenal into the plains of Orissa; in Rennel's map it is erroneously made to take its rise to the north of Singhboom. The source of the Byeturní, as well as the river itself is held sacred; it is said to issue from a huge mass of rock the shape of a cow's head, and that water flows from one nostril and sand from the other; a large fair is held there once every year; there are moreover places of worship with idols at every five coss (ten to twelve miles) from the source down to the holy city of Jājipūr in the plains.

May 31st. I resumed my march at twilight, and did not reach Kuddoogurh till past 11 A. M. On first starting, there was a gradual ascent from the river, the path passing through thin jungle along the base of some small hills to my left (north), the country to my right was open and undulating, with many villages and much cultivation; the high hill of Keunjur, called Baghtunga, was right in front; to the westward rose the beautiful range of hills I had just left;—the landscape was truly beautiful. Some of the smaller hills are cultivated to their very top, apparently with cotton, which ought to thrive well in such soil.

Having reached a pretty village called Coomírí, midway up the northern edge of this beautiful village, I had to turn to the northward and descend into a deep glen, then to re-ascend a rather steep slope strewed with masses of iron clay and iron ore, from thence I passed through a thin forest over a succession of undulations and ascents, more or less steep and difficult, up the north-west face of the mountain. The path, which is very narrow, after winding round it descends for one and a half miles inclining first to the eastward, again to the northward of east; it is excellent for the whole descent, but it is only three feet wide, and is neither calculated for carriages nor cattle, nor for a dawk road, I was therefore at a loss to find a reason for Mr. Babington's servant having ever recommended it for the dawk to travel by; on reaching my camp I was very angry with the man, which led to an attempt on his part to explain why I had been thus deceived and harassed,—suffice it to say that I discovered that there had been much chicanery on the part of the Raja's people as well as the postmaster's, it was this very ghat that poor Capt. Abbott had refused to travel over, and we he might.

Having travelled compass in hand, making occasional sketches, I found that I had been led twenty-two miles, (from Bullera,) in a course which proved to be nearly semicircular, instead of a direct line; it was evident from my observations at Kuddoogurh that I should have continued nearly due east from Bullera, I should then have come direct upon one of the dawk stations called Kalleapāl and have continued along the dawk road, the direction of which is very straight as far as Gorapursa in Mohurbhunj.

I had a fine view of the surrounding country from the top of the mountain, the Buddaum pahar (hill) of the Baumunghattí range (fifty miles east) was distinctly visible, the country between it and the Keunjur hills is tolerably level except to the north towards Kātkarinjeh, where the old road used to run, there are numerous hills in that direction; it was quite evident that the road must be made direct

from the pass near Kalleapal to that to the southward of Buddaum pahar near Jushpur, in which case the present dawk road would be left entirely to the left (or north), and Keunjurgurh, where the Raja resides, would be left about eight miles to the southward, thereby all trouble to us, and annoyance to the Raja, would be at an end, for in verity, it appeared that the great desire to prevent the road passing through or near the gurh, was the great cause of all the mischief which had arisen; the Raja's dewan, who had come with a letter of compliments from his master, was overjoyed when I assured him that such was the case.

There being no hut available in the miserable hamlet of Kuddoogurh, I was obliged to take shelter under a small tree (for there were none of any size); the day was exceedingly hot, therefore I suffered a great deal. I felt very uneasy both for my own safety and that of my followers; we had the very worst of water, nearly putrid, and the cholera was sweeping away hundreds. The Raja had two days previously lost his mother, his eldest son, and a nephew by that dreadful scourge. We were all too much fatigued to be able to march again in the evening, so we passed the night where we were.

The Raja sent all kinds of supplies his town could afford, and insisted on my accepting all as my feast; I thought it prudent to humour him, for my offering payment would have been looked upon as unfriendly.

1st June. Having resolved on making a long march to the banks of the Byeturní, where I was sure of getting good water, I broke ground at 2 A. M. The road was good but very tortuous leading from village to village, sometimes to the north of the true line, at others to the south; the country is high and undulating, with many rocky eminences of grey granite which in many places protrudes through the surface, having the appearance of extensive pavements; there appears to be (generally) but a very thin stratum of soil for there are but few trees of any size, the most common is the pullas (*butea frondosa*) and a large shrub with a pretty white blossom, having an overpowering sweet odour which the natives are very fond of, they put it in their hair and through their ear-rings.

I travelled by many comfortable looking villages on my way; the proportion of jungle to cultivation is perhaps as five to one. The largest village I passed through was Phoolkonlaie,* about two miles before reaching camp. This place is a Sassun or Brahmun colony,

* It was from this place that I was driven back by sickness in January of the present year.

therefore the cultivation is extensive and superior, for the Brahmuns throughout Orissa possess the pick of the lands; there is much fine sugar-cane grown here.

Mungulpoor,* where I encamped, is twenty-two miles from last ground by the road, it is a miserable hamlet belonging to weavers (Tauntís) it is on the banks of the river, which is here 300 feet wide.

I encamped in a mango grove and passed another hot day, and in the evening was prevented continuing my march owing to a violent storm of wind, hail, and rain, accompanied by the most fearful thunder and lightning I ever witnessed; it came on at 6 P. M. I had no shelter but my palkee, which I took the precaution of having placed on some high ground near the huts and raised on four large boulders brought from the bed of the river; many large trees were struck with lightning, and others blown down, it cleared up about half past eight P. M., when the Raja's vakeels came, and had a very long conversation about the road, and unpleasant matter connected with it; I was however convinced that the Raja was not so much to blame as my predecessor had imagined, indeed it was my firm conviction that he had just reason to complain himself.

About 11 P. M. the sentry warned me of the approach of another storm—I resolved on braving it where I was; it soon came on, and twice as severe as the first; nothing could be more frightful than the lightning, and the peals of thunder made the very ground vibrate, it was truly awful, the rain poured in torrents; I lighted a candle to relieve my eyes from the glare of the lightning, and made up my mind for the worst; I did not expect to see the light of another day; I wrote a short memorandum in the shape of a will, and then fell asleep; the storm did not clear off till 2 A. M.

At a very early hour my visitors from Keunjur returned, and intreated me in the most earnest manner to accept the presents their master (the Raja) had sent me; they had the previous evening sent me word by one of my servants (a Brahmin) that they were prepared to pay me handsomely if I would insure that the road should not pass through Keunjurgurh, or any where near it, and that if I would take it out of their district they would even give more;—they alluded to this, and said that at any rate I must accept of what they had brought, otherwise the Raja would not think me sincere in my assurance; I however was determined on refusing, and reminded them of the orders of government, which they must be fully aware of. They still persevered, nor would they be satisfied till I promised to send a letter

* The survey this year was closed here, after halting for five days on account of the incessant rain; every soul was seized with fever.

from next camp to the Raja. This was sad want of faith, and a clear demonstration of the poor opinion they have of European integrity. I tried to ascertain the amount which the Raja had paid, but could not get at the real truth, though it was evident it must have been much; I repeated my assurances that there was no chance of the road passing near Keunjur, and stated that the Raja would be very wrong if he gave a single farthing more, and I requested that he would complain of any person who might in future make any such demands.

The vakeel complained loudly of the trouble, expense, and hardships, their master and his ryots had been put to, by the constant cutting of jungle, and exploring and opening new roads by the post-master's moonshís; however much exaggeration there may be, it is evident that these worthies have certainly much abused their power, and have lived (together with their servants) gratis on the fat of the land, I resolved on putting a final stop to this source of annoyance, by requesting the Raja to refuse to do any thing more, unless he received positive instructions from the proper authorities.

At sunrise I commenced my march towards Gorapursa, a dawk station twelve miles distant; I first crossed the Byeturní which was fast rising, and was attended to the opposite bank (the boundary of Mohurbhunj) by the vakeels and their followers, who were then dismissed, I reached Gorapursa at 10 A. M.; the country I passed over had a gradual rise the whole way with several light undulations, there appeared to be much heavy jungle to the right of the road, but in its immediate vicinity there is a fair proportion of clear and cultivated land. I passed one large village called Sukroorí two miles before reaching that of Terentí, where there is a dawk station; from thence to Gorapursa there is one continued forest of small trees and underwood, the distance is about seven miles, and Terentí above six from the Byturní; four miles beyond Terentí I crossed the Krère Bundun river, this water was about two and a half feet deep, and running very rapidly, the bed is gravelly and the banks exceedingly steep.

I encamped under a noble banyan tree and passed a pleasant day, for the air was very much cooled by the previous night's rain, the country in the immediate vicinity is also high and tolerably open, nevertheless it is dreadfully unhealthy; there is a guard of a native officer and thirty men from the Ramgurh battalion stationed here, it suffers much, there are seldom more than one-third of the men fit for duty, the rest being laid up with fever; I found the native officer to be a very well informed man, he was very attentive to my wants and gave me much valuable information; I got him to write a letter to the Raja of Keunjur at my direction, touching his offer of bribes, and sent

it off by the messenger who had accompanied me from Gobindpúr. I considered it advisable to have some respectable witness to this unpleasant business, for many good reasons.

I was about to resume my march at 5 P. M. when a dark north-west horizon indicated the approach of more bad weather; a range of new huts had just been completed, I removed my palkee &c. into the largest which was also the most sheltered, it was that of my attentive host, the native officer; I had barely time to remove when a fearful hurricane came on accompanied with heavy rain, and hail stones of great size; almost every hut was blown down, or so much out of the perpendicular that they were rendered useless, the water was ancle deep; I had taken the precaution to place my palkee on four large stones, so that I escaped the wet; the storm lasted till near midnight continuing more or less violent; I was more fortunate than I had been the previous night, and felt grateful for such shelter.

3rd June. I was unable to march before sunrise for want of coolies; I then started onwards for Nowagaon, the second dawk stage in advance; I had a very unpleasant trip, owing to the muddy state of the greater part of the road, my progress was very slow, not reaching my ground till one P. M.; the distance travelled sixteen miles, the direction of the road was slightly to the southward of east, the country undulating as usual. For three or four miles it runs through a thin jungle, and then enters the clear land in the vicinity of the Buddaum pahar and of Jushpurgurh, at the eighth mile I reached a large village called Maldapursa, I rested here and breakfasted, after taking the compass bearings and sketching the features of the country; I then proceeded on my journey,—the first mile or more is over the plain, the road then crosses the continuation of the Buddaum chain of hills, which ends three miles to the south-west by Jushpur; there are three rugged ascents, and as many descents, they are impassable for cattle (laden) therefore very difficult for a palkee to be carried by, I walked the whole way, I was informed that there was a passage round these hills by which the ghat, which is called "Tinderí ghat" can be avoided; in my travels this year I have proved this to be correct, I shall allude to the subject in a future page. From the ghat to within a few hundred yards of Nowagaon, the forest is very heavy, but the road is good.

I shall not say more of Nowagaon at present than that it is near the western extremity of a long narrow and once thickly populated valley in the zemindarí of Baumunghattí, the whole of which is now a vast forest, having been devastated during the Cole insurrection consequent on the difference which existed between Narindra Maha-

patur, Zemindar of the Purgunnah, and his lord the Mohurbhunj Raja; there are about twenty-eight miles of dawk road down the valley, and four dawk stages, viz. Nowagaon, where I encamped, Arjunbilla, Pooranapáni, and Kurrumbilla, this last place is at the eastern extremity at the top of the Nittai Maunghur ghat by which you descend to the plains.

I left Nowagaon before sunset, and pushed on to Pooranapáni, where I rested part of the night; I had much difficulty in procuring even a couple of coolies to replace two who had escaped, in consequence of this I discovered another piece of impudent roguery of one of the Cuttack myrmidons, a servant of mine having peached against him, it was this;—I had tried all manner of means to prevent him from pilfering as he passed through the villages, he had however managed to collect a heavy cooly load of bows, arrows, banghy sticks, latties (walking clubs) and fowls, added to these a charpoy, this I took away during his absence, and threw it into a thicket, the former articles I hid in the thatches of the huts, took the cooly for myself, and marched on.

About three A. M. of the 4th June, I continued my journey, reaching Bissáí, a large village three miles from Pooranapáni, at day break; I here changed coolies, and proceeded on to Nowagaon Oopurbaugh which place I reached at noon, having travelled forty-nine miles, within little more than twenty-four hours; at four P. M. I resumed my march towards Seersa, on the banks of the Subunreeka, which place I reached a little after sunset; the distance was only five miles, but I was detained for an hour in a large village owing to a severe north-wester; I found my dawk ready, and bidding farewell to the jungles started for Mednipúr, which station I reached the following morning; I rested there during the day, and continued on my dawk trip to Oolooberriah, arriving at ten A. M; having procured a boat, I left this place by water and reached Calcutta at sunset; thus ended my labours for the year 1838, having from the 16th December previous up to the 5th of June, travelled upwards of 2100 miles.

Having passed so rapidly from Gorapursa to Mednípúr I could not observe much, I have this year reconnoitred all this tract of country in the course of my survey duties, I shall therefore conclude with a few marks on its features and capabilities.

(To be continued.)

JOURNAL

OF

THE ASIATIC SOCIETY.

No. 92.—AUGUST, 1839.

ART. I.—*Note on the Mechis, together with a small Vocabulary of the Language. By* A. CAMPBELL, ESQ. *Assistant to the Resident Nipal, in charge of Darjeeling.*

To H. T. PRINSEP, ESQ.
Secretary to Government of India.

Fort William.

SIR,—With reference to my letters of the 13th and 20th ultimo, I have the honor to forward a few Notes on the Mechis, with a small vocabulary of their language, for the information of his Honor in Council.

I have the honor to be, Sir,
Your most obedient servant,
A. CAMPBELL.

Darjeeling, September 5th, 1839.

The Mech people inhabit the forest portion of the Turai stretching along the base of the mountains from the Burrumpootur to the Konki river, which leaves the Nipal mountains about 20 miles to the west of the Mechi River. In this tract they are respectively the subjects of the Nipalese, Sikim, and Bootan governments, occupying along with the Dimals—an allied tribe—and a few Garrows, a country of about 250 miles in length, having an average breadth of from 12 to 15 miles. In the eastern portion of the Nipal Turai they are but recent settlers;

at Nagol Bundi, on the right bank of the Mechi river, there are about 20 families; at Kalikajhar about the same number; and, west from these places, in the thickest parts of the forest, there are several small colonies, amounting in all to about 150 or 200 families. In the Sikim Turai, between the Mechi river and the Mahanuddi, there are about 400 families; to the east of the Teestah river, and in the Dooars of Bootan they are still more numerous, and to this latter portion of their *habitat* they point as the original seat of the tribe, although its name would indicate its derivation from the Mechi river. I believe that Mechis are also to be found on the northern confines of Lower Assam.

The tribes immediately in contact and mixed with the Mechis, are the Koochias or Rajbungsi Bengalese, (whose original country is Kooch Behar,) the Dimals, Thawas, and Garrows. These neighbours of the hills are the Limboos, Kerantis, Lepchas, Murmis, and Bhotias; of these several tribes, I hope to furnish some particulars anon. As they associate much with the former, and frequently meet the latter at the frontier marts, their habits and manners are naturally a good deal modified by the contact; still their peculiar usages, form of religion, language, and appearance, entitle them to the acknowledgment of their claim as a distinct people. They are fairer than the Koochias, and have little of the regular features of the Hindoo, which characterize that tribe. The cast of the Mech countenance is strongly Mongolian, but accompanied by a softness of outline which distinguishes them readily from the more marked features of the same order—of the Lepchas, Limboos, and Bhotias. They resemble the Newars of the valley of Nipal, in complexion and feature, more than any other people I have seen in or near these mountains; they are taller, however, and the fairness of complexion is entirely of a yellow tinge, whereas the Newars are frequently almost ruddy. Many of the Mechis strongly resemble the Mugs and Burmese in face and figure, and like them are much addicted to drinking spirits, smoking, and eating pawn. In common with the Assamese, they are fond of opium eating.

They never live on the hills at a higher elevation than 800 or 1,000 feet, and scarcely ever settle in the cleared and inhabited parts of the Turai, but, keep entirely to the forest in which they make clearances, cultivating crops of rice and cotton with the hoe, and grazing buffaloes. The malaria of the forest so deadly to strangers, does not at all affect them; on the contrary, they are a remarkably healthy race, and dread visiting the plains, where they are subject to severe fevers. They have no towns, and rarely even live in permanent villages, generally quitting a clearance after having had two or three successive crops from the land, to take up their abodes in a fresh portion of the forest. In the

above respects the erratic habits of the Mechis resemble those of the Thawas especially ere that race commenced, as lately, to form permanent villages in the open Turai; and are identical with those of the Dimals.

The religion of the Mechis, in so far as they have any, is the Shivaite form of Hindooism, but it goes no further than to the occasional sacrifice—when they can afford a merry-making—of goats, buffaloes, pigs, and fowls at a clay image of Kali, when they drink spirits and a fermented liquor made from Murwa to excess, and indulge in much licentiousness. The influence of the Brahmins is not recognised; they have no guroos, nor priests, nor temples; do not perform the shrādh; and bury the dead in any convenient part of the jungle, confining the obsequies to a feast among the relations of the deceased, and placing spirits and prepared food over the grave; tombs are never raised over the graves, nor have the small communities any common burying ground.

There is no distinction of castes among them. In the Nipal Turai the population of which is composed of the most varied assemblage of would-be Hindoos, and almost destitute of real ones, the Mechis are admitted within the pale, and water is taken from their hands by persons of caste, although they eat fowls, buffaloes, the cow—when beyond the Nipalese limits—and the carrion of all animals except that of the elephant, which animal is held in high respect by them, although not venerated, so far as I can learn. The carrion eating and other impure but cherished practises of the Mechis are not followed to the fullest extent in Nipal, where Hindooism is at a high premium, and breaches of the Hindoo law by all pretenders to that faith are punished with much severity. In Sikim and Bootan, however, the Mechis indulge their natural habits, and are as omnivorous a race of human beings as any in the world.

Marriages are contracted in youth or adolescence at convenience, the men purchasing their wives at prices varying from 10 to 60 Rupees, according to the beauty of the female and the means of the male. When an accepted husband has not the means of paying for his wife in money he joins her family party, working for the parents until he has fairly earned his bride according to previous contract; like the poorer classes elsewhere in India, a man can seldom afford to have more than one wife at a time, there is no restriction however on this head.

The women share equally with the men in all the labors of the field, and manage household affairs exclusively; they likewise attend at the periodical fairs (Hauths) selling, buying, and bartering the various

articles of home and imported produce. They are generally comely and disposed to fleshiness; the usual dress is a sari (robe) of red silk made of the "Indi" or thread of the silk worm which feeds on the castor-oil plants, and their ornaments are confined to bangles and necklaces of white shell. The Indi silk is entirely a domestic manufacture, and wove by the women, who also color it with the lac dye. The Mech language has no written character, nor is it, I believe, allied to the Sanscrit; whether it is of Tibetan or Burmese extraction, or akin to the aboriginal Indian dialects known among the Coles, Goonds, Beels, and other wild tribes, I am unable to say; but perhaps, the accompanying small vocabulary may enable competent persons to decide its root and original country. The Mechis are necessarily uneducated, except with a very few exceptions, in the Bengali language, from which they have derived all the terms in use for articles common to a state of life removed from the savage. I regret, that I have not as yet had an opportunity of meeting a person intelligent enough to give me some idea of the construction of the language; this must remain for further inquiry. In the vocabulary I have omitted entering words for which the language has no equivalents of its own, except in a few instances, to prove the rule above noticed. All the words with B affixed are evidently corruptions of Bengali or Hindi; none of the metals except "silver" and "iron" have names. There is no word for "money." Gender is designated by the affix of "Jilla" or male, and "Jeu" or female, for all animals but man.*

In the arts the Mechis have made but small progress, they excel in the care of their cotton agriculture, but as they grow only the common annual plant, the produce is not of a superior kind. Weaving is confined to the women as a domestic art. They are not addicted to trade, are averse to military service, have no artizans among them, are truly in a very primitive state of society. They are however very cheerful, have no jealousy or prejudice towards strangers, are industrious, and honest, and crimes of violence, so far as I can learn, are of rare occurrence among them.

A. CAMPBELL.

* The names of the months and days of the week are Bengali, and the Mechis who furnished me with the vocabulary are unable to give more than nine of the cardinal numbers in their own language.

VOCABULARY OF THE MECH LANGUAGE.

fire, wad
water, dîee
air, bar
the earth, ha
stone, yoontie
God, modiè
father, appa
mother, aiè
brother, koî
elder ditto, ada koî
younger ditto, āki koî
son, bēēsha
daughter, bēēsha hindon
uncle (paternal), adhii
ditto (maternal), amaî
cousin (paternal uncle's son), phōōmbôi
wife, bihi
house, nau
raining, noka haioo
tree, bun phang
bamboo, wah
rattan, rydung
iron, shor
wood, bon
sword, choongri
knife, dhaba
bed, kutt
dog, chēēma
elephant, megadett
rhinoceros, gandha
goat, borma
road, lama
mountain, hajoo
jungle, hakea
river, dihi
pool, bīlōō
fish, nah
snake, jeebo
tiger, meesāh
bird, tausen
the sun, kranondoong
the moon, nokabur
guroo, mōōsho
hog, yoma
rice, myrang
paddy, mye
cotton, rōōn
blood, tye
flesh, mōōdun
hair, kumun
teeth, hattye
eye, mōōkun
nose, kōōntōōng
ear, kumma
head, koroh
neck, kortunna
mouth, koogha
tongue, chulai
thorax, cherupa
belly, udihi
thigh, phenda
leg, yadii
foot, yappa
stars, hatoorki
clouds, jumai
knee, hantoo
finger, nāshima
nail of ditto, nashi kor
palm of hand, nakatulka
loins, janji
child, kataû
old man, briebà
young ditto, kōōkringindong
ditto female, shikala
handsome, mōōjang
oil, taû
salt, shóónkri

pepper, banjóólóó
maize, toomba
to die, thibaî
to sleep, móódóóbaî
sit down, jhopiî
stand up, jhickat do
go thither, oojhung tang
come here, puki
go quickly, kōōkri tang
lie down, moodoo no.
shut the door, doowar phang
go to the field, hooa tung
build a house, no lao
cut some wood, bon san
fetch some water, dîee labo
feed the child, koto jani ho
kill a fowl, tâoo shītuk
boil some rice, meekum chong
light a fire, wad chāō
milk the cow, doodoo laboo
go to market, hattia tung
shoe, jotah (B)
horse, ghorye (B)
cow, mashujuh
buffalo, maishuo
door, doowar (B)
ghee, ghu (B)
milk, doodu (B)
sugar, chinee (B)
turmerick, huldi (B)
thunder, jumai homdung
lightning, nophlambo
cloth, (cotton) he
ditto of castor-oil insect, indi
ivory, megadet hatye
horn, kong
hide, āboo
hoof, yakong
tail, lanjye
wool, komun
a young elephant, megadet oodai
a grave, phokma

a man, manchi
a woman, hinjan
plough, wayo
cart, hoo
a bow, jeeleet
an arrow, bulla
language, bhagia
a gun, shelaî
table, phalla
chair, kumpulai
paper, lēka
pen, kullum (H)
lock, [no word]
key, [ditto]
taut (coarse hempen cloth), phasala
hemp, phātoo
til (sesamum orientale), shibeem
mustard, bishwar
dal (pease), shobai
pawn, phātye
betel-nut, gwŷe
lime, chūnye (H)
brass, peetulye (H)
silver, tais
a temple, modīe ne no (literally house of God)
a flower, booibar
mangoe, tiekjo
plantain, tali
ditto tree, lie phang
lime tree, narengi phang
fruit, betü
root of tree, rudda be phang
branch of ditto, dalye
leaf of tree, belye
a bridge, chye kong
build a bridge, chye kong ka
make a road, lama yāw
a plain country, ha gēbang
the plains of Bengal, haien
Bootan, aga phar
snow, hem

snow falls, hem gooklindung
it rains, noka hidung
warm water, goodung dŷe
cold ditto, gooshu dŷe
drink water, dye ling ni
good, gahum
bad, húmma

blue, goochum
white, goophoot
red, gujja
yellow, koomoo
green, gangohu
black, koomun

[No other Colors distinguished by names.]

leather, bigoor
mattress, gondoo
a Bootanee, kongar
a Bengalli, hāshá
a Mahomedan, tōōrōōp
a Priest or pujari, modie hōōis
a Nipalese, muggur
a boat, nan
a jungle fowl, hangrūni dāusru
a male, jilla
a female, jeu
spirits, chaoo
large, ghidett
small, udye
tall, gujau
short, gahye
broad, goo-ar
a great man, grah manichi
to laugh, meniyao
to cry, dagup
to beat, shītuknuh
to be angry, brapmo

to swim, chanturri
cotton seed, koon tye
ditto plant, koon phang
sugar-cane, kooshiar (B)
a bear, moofur
wild dog, sheekoo
vulture, sheegoon
crow, taûka
a well, dîre kor
blacksmith, kamar
weaver, he daio
huntsman, mye kankea
a spotted deer, kotja menbeang
distiller, shoondi
fine cloth, he goba
coarse ditto, he rujja
new ditto, he guddan
the sky, no krang
above, chá
below, ching
to one side, chapin

Cardinal Numbers.

one, munche
two, munye
three, muntum
four, munbre

five, munbha
six, mundho
seven, munchini
eight, munjo kunnü

[No numeral beyond this]

night, hor
day, chán
month, más (B)
year, buruk (B)
soft, oofra

hard, guzia
cheap, gair
dear, kom
heavy, eeliching
light, rujenchung

wet, ghichi
dry, kran,
beard, konkup
moustaches, [no word]
lip, kooshuti
eyebrow, mooshu kor
eyelash, moosheam
good rice, mujang myrong
sweet, kolan
sour, kokye
bitter, goká
light, monabai
darkness, komshibai
raw, kotung
boiled, komun,
hunger, meenka honkia
grass, jheekāb
lame, nating kora
deaf, kumma kanai
dumb, ryeinga
pain, sadung
pleasure, moongu sagyi
sickness, chobea jodung
small pox, bontijaia
fever and ague, loomgaia
rheumatism, beeshtong
belly ache, yudichaia
head ache, koro chaio
purging, kābai
to-day, dinisanchi
yesterday, kapunsanche
day before ditto, sombursanche
the day before that, tamnepursanche
to-morrow, miasanchi
outside, shetula
inside, noh
before, shekang
behind, yeun
quickly, kookei
slowly, larhay
a wall, jujoor
a post, tongphang
a beam, mandali
a roof, mookoom
a cooking pot, kanta
a large ditto, mikamduh
a water ewer, di heu
a plate, toorsi

Example of forming feminine and masculine.

bull, moshu jilla,	cow, mashu jeu
dog, cheema jilla,	bitch, chema jeu
buck, borma jilla,	she-goat, borma jeu
tiger, meeshāh jilla,	tigress, meesah jeu
nephew, adye,	niece, anai

Sentences.

What is your name?	nunni mooa mamoo
Where are you going?	noo bujuntanguh
Whence come you?	noo bujung prapaio
Where do you live?	noo nūa mongwhye
What is your father's name?	noong noorkpa mammo
Shew me the road to Pankabari?	Pankabari lama buriye
What is the name of that hill?	be hajoo māmoo
What is the price of rice at Dorjeling?	myrong sirifehe Dorgeling maelai

Names of Men.	*Names of Women.*
Chakla,	Phagooni,
Sunka,	Bisaje,
Balasache,	Bisahawa,
Deringa sache,	Furgunnic.
Poojoon,	
Esula,	
Puharoo,	
Oonti,	
Jenti tokla,	
Mhedla,	
Secuta.	

A. CAMPBELL.

ART. II.—*Researches on the Gale and Hurricane in the Bay of Bengal on the 3rd, 4th, and 5th of June,* 1839; *with reference to the Theory of the Law of Storms in India. By* HENRY PIDDINGTON.

PART II.

That the hurricane part of the tempest which we are considering was blowing in tolerably well defined circles, has been, I think, clearly shewn in the foregoing part of this memoir. The object of this second part, is to adduce evidence, which shews that it was at the same time both a *gale,* i. e. a strong wind blowing in with tolerable steadiness from one quarter of the compass; and a *hurricane*, namely, a violent wind blowing in a circle or vortex of greater or less diameter. At present too it seems probable, from the dates, that the gale produced the hurricane. We may consider that this storm was one of those which usually occur at the change of the moonsoon from NE. to SW., which in various parts of the Bay may be said to take place between the 15th May and 15th June. It is from the 1st to the 15th June that we look for the rains in Calcutta, though sometimes, as in this year, they may be said to have begun in April. It will be borne in mind then, that whatever follows, whether facts or hypotheses, relates only to the beginning of the SW. monsoon. Future observations will inform us, whether the October Gales as they are called,—though they sometimes occur in November,—are subject to the same or different laws. (The European reader will recollect, that October is the epoch at which the NE. monsoon takes the place of the SW. one.)

If we look at the Bay of Bengal, Map No. II, we shall be struck with the fact, that while it is bounded on the East by the mountain range which stretches from the Malay peninsula to Bootan, often approaching very near the shores, and rising to the height of from 3000 to perhaps 5000 feet on the Arracan coast; it is also bounded, on the West, by the Coromandel range, which supports the Eastern side of the elevated table lands of the Deccan. At the valley of the Mahanuddee (the river of Cuttack) however, at its junction with the Vindiya range, it turns suddenly to the North-Westward and Westward, leaving thus between it and the mountains of Arracan, the wide opening from Point Palmiras to Chittagong, which, to use an orientalism, is the *gate* to the plains of Bengal.

The salient angle, formed by the corner where the Vindiya and Coromandel ranges meet, and the entering one, where the Bootan, or Himalaya, and Arracan and Cachar ranges join (leaving however the valley of Assam as an opening for the great Burrumpooter to flow through,) thus form, as it were, an angular channel; through which all the lower strata of the current of the SW. monsoon may be supposed to find their way over the plains of Bengal and up the valley of the Ganges; and this is their natural course. But we may suppose that the SW. monsoon when urged to any great force at the mouth of the Bay, about Ceylon, must strike against the mountain ranges of Arracan in about from lat. 16°, which is that of Cape Negrais, to lat. 20° or 21°; or about that of Arracan; and, being deflected thence, must turn off in a paraboloidal line towards the great opening offered by the low lands at the head of the Bay, and thence proceed up the valley of the Ganges as before.

But when the head of the Gale is thus deflected, it may meet also with that portion of the monsoon which has blown along the Coromandel range and coast—called the "long-shore wind," by the old navigators —which has a much shorter distance to travel; and there occasion an eddy of variable winds, whirlwind or hurricane, according to the force of the first impulse—and this again influenced too, doubtless, by many causes to which we are yet strangers.

If this theory be true for these tempests, we should look to find points, about the meeting of the two currents, varying in position according to their respective forces, at which, during these gales, it should be comparatively calm, or blowing but moderately; and it is curious that at Balasore, in latitude 21° 28′, and at the Black Pagoda in 19° 62′ N. this comparative calm is found to have existed. My authority for this is the following letter.

Balasore, July 31st, 1839.

DEAR SIR,—I should have been much at your service in giving you all the requisite information concerning the gale here, had any taken place, but we had only strong gusts of wind at NE. to SE. with uncommon heavy rain on the 5th, 6th, and part of the 7th of June, which even to this day has kept back the rice crops. The thermometer fell to 81½°, and unluckily my barometer was broken a few days prior, so that we could only foretel a gale coming on by the blackness of the heavens to the Eastward; which gale did not reach from the Northward of Point Palmiras to Balasore, but blew hard from Point Palmiras to below Pooree to the Southward. No vessels were lost in the Balasore roads; but to the Eastward they may have been lost, as a Telingah topgallant mast was picked up, besides pieces of deal boxes, supposed to have contained glass-ware, marked "*Protector*," which vessel was lost to the Eastward, between the reefs, last October.

Gales at Kedgeree, though blowing dead to windward of us, distant seventy-five miles, do not always reach this coast; as in the May Hurricane of 1833, when the "*Duke of York*" was blown from her moorings at Saugor across to Hidgelee, and became a wreck, yet the gale did not reach here, although the bank to the Eastward in the heavens so plainly indicated a gale, that every person here barred up their doors and nailed them. We only had a good topgallant breeze.

The Neilgherry Hills appear to influence the winds much on the coast north of Point Palmiras, as the winds are generally throughout the SW. monsoon, SW. to W. in the morning to 7 A. M., veering round to S. and SE. P. M.; and in the NE. monsoon, W. to NW. veering round to NE. after 8 A. M.

(*Signed*) A. BOND.

Mr. Richardson, Branch Pilot, informs me, moreover, that during the fury of the Gale of 1833, in which the "Duke of York" was wrecked, and he himself was driving about with all his anchors down, some passengers whom he had previously landed at the Black Pagoda were upon the top of it, and felt no excessively violent wind, though they *saw* the horizon very black, and the sea dreadfully agitated to the North Westward of them.

The slow rate at which our vortices travel onwards is very remarkable, but seems, if future observation should confirm it, to afford countenance to this theory; for, as before said, we may consider them as pent up between the current passing round the vortex of the parabola and the Coromandel range; and no doubt to feel, as water in similar channels would do, the repulsion from these last. It is clear, as shewn in p. 576, by the log of the "Indian Oak," that the monsoon was blowing up along the coast as far as Vizagapatam, from between which and Gan-

jam, to Point Palmiras, the Hurricane was probably felt. Its limit to the North we well know to have been between Point Palmiras and Balasore, but I could obtain no intelligence from Ganjam to fix a limit to the South.

We should also find that, as the current of air proceeds up the valley of the Ganges to the North Westward, it should give rise to an Easterly Gale, which has also in this instance occurred, as will be seen by the following extracts, the first being from a very able and interesting letter from Mr. Ravenshaw, of the Civil Service, dated Chuprah in Behar, lat. 25° 46′ N. long. 84° 46′ E.

Chuprah, July 17th, 1839.

DEAR SIR,—Having observed in the Newspapers that you are desirous of obtaining information connected with the Gale which occurred in the Bay of Bengal from the 3rd to the 5th June inclusive, I have the pleasure to contribute my mite to the stock of facts which you are engaged in collecting. The enclosed extract from my Register will shew the height of the Bar. and Ther. at 10½ A. M. during the Gale, and for some days succeeding it. I regret that my official duties prevented me from taking observations at 4½ P. M.; but I hope the small amount of information afforded will not be without use, in shewing the direction and duration of the Gale of this district, inland from the Bay of Bengal. It will be remarked, that the Gale did not commence here until the 4th instead of the 3rd June, and that it terminated on the 7th instead of the 5th. The Bar. kept falling during the continuance of the Gale, and strange to say did not reach its minimum until the day after the violence of the Gale had ceased, i. e. the 8th. The direction of the Gale was nearly due East, but on the 8th the wind shifted to the SW. and West, and on the 9th blew as furiously from the latter quarter as it had previously done from the East; towards evening, however, it shifted to the NE. On the 10th it changed to SE., on the 11th to SW.; and the following day to the West. On the 14th and 15th it again veered to the NE. and EbN. until on the 16th it resumed its old position of East, which is the usual direction from which it blows at this season of the year. From the above it would appear that the wind, after the violence of the Gale had subsided, acquired a rotatory motion and turned twice round the compass in a Southerly direction before it recovered its equilibrium. By letters received at the time from Mootebarry, 60 miles North of Chuprah, and from Gyah, about 90 miles South of this station, I learnt that the Gale occurred with equal violence at those places. The breadth of the column of air put in motion was therefore at least 150 miles, and probably much greater. It would be interesting to ascertain the exact limits of this Gale inland as well as at sea, which object might be effected by your addressing a circular letter to the residents at each of the principal stations in the Western Provinces e. g. Allahabad, Cawnpore, Agra, Delhi and Saharunpore. In-

formation from these points would probably give the extreme length to which the Gale extended, as information obtained from Jubbulpore, Gwalior, and Ajmere, would shew the extreme breadth. I do not recollect at present from what direction you stated the Gale to have blown in the Bay of Bengal, but if from the SW., the usual course of the monsoon, it is difficult to account for its blowing here from the East, unless we suppose the column of air to have been driven against the Assam and Himalaya Mountains, and by them turned in a Westerly course. In this event, it is probable that the Gale may have subsequently followed the direction of the mountains NW. perhaps as far as Hurdwar.

I conclude that it is not your intention to confine your observations and inquiries to the Gale under consideration, but to all storms of magnitude in the Bay, or its vicinity. The Gale which seems to occur almost annually in the Bay of Bengal in the month of October, would, from its regular recurrence, form an excellent subject for observation. It was felt at Chuprah during the two years that I have been stationed here. On the first occasion it blew (to the best of my recollection) from the East, whereas last year it came from the West.

It appears to me very desirable that either Government or some public body like the Asiatic Society, should take measures for securing an uninterrupted official record, not only of the periodical and occasional storms which extend generally over large tracts of country, but also of local atmospherical peculiarities—the changes in the direction of winds and storms occasioned by mountains and the larger rivers—also of the general character of the seasons in different parts of the country—the paucity or abundance of rain—the minimum rise of the Ganges, Burrumpooter, &c.—the price of grain as affected by the seasons—the date of the commencement and termination of the rains—of the hot winds—or of any other prevailing winds.

The Asiatic Society through its numerous members might, I should imagine, without difficulty obtain information on the points adverted to from all the principal stations in India, which should be annually digested and published in their *Journal*. These again will be compared and generalized every 10 years or so by a Meteorological Committee of the Society. The Asiatic Societies of Madras and Bombay might be requested to adopt the same system throughout their respective Presidencies, so that the observations might embrace the whole of India. Such a combination of laborers in the cause, and the consequent accumulation of facts, assisted by the rapid progress of science in these days, would almost justify the hope that we may ultimately arrive at the discovery of some general laws by which the seasons are regulated; and by which we may be able to foresee and to guard against both inundation and famine, in a country where their ravages are often so destructive to life and property.

(*Signed*) E. RAVENSHAW.

1839.	Bar. at 10½ A. M.	Ther. attached	Bar. at 4½ P. M.	Ther. attached	Bar. at 10 P. M.	Ther. ——	Remarks.
June 4th	No observation.		....	....	....	....	Strong and continued gale from East, with occasional rain.
5	29·50	86	....	....	....	....	
6	29·42	86½	....	....	....	....	
7	29·32	83	....	....	....	....	
8	29·30	84	....	....	....	....	Rain; wind SW. shifting to West.
9	29·34	81½	29·32	82½	....	....	Ditto, W. do. to NE.
10	29·40	82	....	....	....	....	Ditto, Wind SE.
11	29·39	83	....	....	....	....	Ditto, SW.
12	29·38	85	....	....	....	....	Ditto, W.
13	29·38	85	....	....	....	....	Ditto, W.
14	29·47	87	....	....	....	....	Ditto, NE.
15	29·58	87	....	....	....	....	Ditto, EbN.
							East, the usual direction of the wind at this season.

N. B. This gale extended in *breadth* from Mootebarry, 60 miles North of Chuprah, to Gyah, 90 miles South—and perhaps further, but of this I have no authentic intelligence.

As far then as our present knowledge extends, and referring to the state of the Gale in the Southern part of the Bay, we find that the impulse, which may be said to begin to be violently felt on the 31st by the *Susan,* did not reach Chuprah till the 4th, when it produced an Easterly Gale, terminating on the 7th, shifting to the South-West and West on the 8th; the counter-gale and eddies, if we may so call them, being only the irregular movements of the various currents produced by this great derangement of the usual equilibrium of the aerial currents, which, as is remarked, are usually from the East at this season; affording also a proof towards the theory which I have ventured to offer. When the monsoon slackens the Southerly and South-Westerly gales, and currents may find their way as far inland as this place. The dates show that the Gale did not begin at the point to which it blew, but that it was a progressive impulse travelling about the direction which I have laid down. Assuming this theory as a *guide* only, let us now see how it accords with the facts we already possess here. By referring to the Map, No. II. we see that though along the coast from Madras to Vizagapatam, by the Indian Oak's log at Masulipatam, by the Master Attendant's report from Coringa, and up to the 3rd at noon by the Laurel Amelia's log, it was fine, though threatening; yet from the 31st May to the 5th June, by the logs of the Lady Macnaghten, Petrel, Susan, Jumna, and Laurel Amelia—to which too we might add those of the Nine, Eden, and Mobile—a severe gale was blowing between WbS. and SW. diagonally across the Bay, in lines about parallel to one drawn from the centre of Ceylon to Cape Negrais, the termination of the Arracan coast. We find that at Cheduba on the

2nd, and part of the 3rd, the John William Dare had a severe gale from S. to SSE. the gale being then deflected by the mountains of that coast. At the harbour of Akyab No. 27. we find that our meagre notices give us "Easterly winds with hard gales" on the 2nd; on the 3rd, and 4th, "brisk;" on the 5th, "gales;" and on the 6th, SW. winds.

At Dacca* Dr. Lamb's Register gives as follows:—

	Winds.	Bar. 10 A. M.	Ther. Noon.
June 1st.	SE. East SE.	29·68	90
2nd.	SS. East,	,, 61	90
3rd	East South SE.	,, 61	91 3 inches of rain.
4th.	East SE. South,	,, 68	88½ 6 inches of rain.
5th.	South SE. SbE.	,, 71	85

So that here the winds were varying between South and East.

At Jellinghee, in lat. 24° 8′, long. 88° 42′ E. about 140 miles WbN. of Dacca, and about 100 NbE. of Calcutta, at the spot where the river of that name branches off from the great Ganges, a memorandum informs me as follows:—

June 6th, strong Easterly gales with frequent showers.
,, 7th, ditto ditto.
,, 8th and 9th, Frequent showers and cloudy weather.

The following is an extract of a letter and memorandum from H. B. Beresford, Esq. Deputy Collector, Purneah.

"The observations from 4th to 10th inclusive, in the following memorandum, were made on the Ganges, some miles south of Purneah—at least so I understand Mr. Palmer to say:"

Transcript of Extract of Day Book, 1839.

June	1st.	Wind E. blew hard and rained in the morning.
	2nd.	Wind E. a warm clear day.
	3rd.	Wind E. clear morning, rained heavily in the afternoon, and blew hard from South at night.
	4th.	Wind E. blew fresh.
	5th.	A strong gale from the East—rained a great deal—a wet rainy night.
	6th.	Blew hard the whole day from the East, and squalls accompanied with rain came frequently.
	7th.	Wind SE. in the morning—East at noon; died away in the afternoon, rained a little.
	8th.	Wind S. and SE.
	9th.	Wind East—rained a great deal and blew fresh.
	10th.	Wind ESW. and E. again—rained a great deal.

* The Indigo planters of the district of Dacca and the Eastern part of Jessore are well aware of the tendency of strong Easterly winds to cause rapid rises of the river, and severe loss to them by inundating their plant. If we suppose the Easterly gale to be a Southerly and South Westerly one in the Bay, we obtain an additional reason for this, to the common one of the Easterly gale being partly against the current of the Ganges; i. e. the waters of the ocean are driven up into the NE. corner of the Bay.

"The inclosed notes I made in original, and regret not having it in my power to comply more fully with your request."

June, 1839.

June 1st. Light airs from NE. to E. cloudy at times.
2nd. Ditto, Ditto.
3rd. ENE. cloudy, or slight showers from ESE.
4th. Ditto, ditto light fresh breezes with slight showers.
5th. Heavy ENE. wind, very cloudy with light showers.
6th. Ditto ENE. with constant sleet and rain.
7th. Heavy ENE. with sleet, wind veered S. to SSE. occasional showers.
8th. Heavy ENE. veering round to South with rain—night, Northerly.
9th. Fresh ENE. cloudy with heavy showers.
10th. Rain almost all day—clouds flying from East—Light airs from West, a great deal of rain has fallen, the nullahs rising very high, threatening to overtop their banks.*

At Ghazeepore lat. 25° 35′ N. long. 83° 33′ E. and 41 miles East of Benares and 84 miles W.½S. from Chuprah, Dr. Jackson kindly forwards me a journal for the month of June, from which the following is an extract, which I copy to the 11th, to shew how remarkably they agree with those of Mr. Ravenshaw from Chuprah, in the sudden change of the wind, from ESE.—which we may call its average from the 1st to the 7th,—to SW. on the 8th. The subsequent changes seem to indicate, as before said, that the more direct current of the monsoon had for a short time forced its way upwards; for the remainder of the month the wind is variable from E. to W. with sultry weather, as usual there in the month of June.

Date.	Winds.	Ther.	*June*, 1839.—*Remarks*, &c.
1	ESE.	98	Pleasant breezes, fair weather, 11 A. M. cloudy with a few drops of rain, hot and sultry.
2	ESE.	98	Light breezes, fair weather, hot and sultry.
3	ESE.	99	Fresh ditto, cloudy, at intervals hot and sultry; at 1/30 P. M. a squall, no rain.
4	ESE.	96	Fresh breezes, cloudy at intervals, with hard squalls, fair weather.
5	ESbE.	92	A. M. cloudy and showery, hard gales with showers at intervals.
6	SEbE.	86	Hard gales, dark cldy. weather, showers at intervals, night rainy.
7	SEbE.	86	Ditto ditto ditto ditto with heavy rain, 7 P. M. wind shifted to the SW.
8	SW.	80	Dark cloudy rainy weather, with hard squalls of wind, 6 P. M. fair and continued during night.
9	SW. to ESE.	80	Morning dark, cloudy and fair, which continued throughout, 5 P. M. wind shifted to the ESE.
10	ESE.	81	At 3 A. M. dark and cloudy with drizzling rain, at 5 fair, moderate breezes.
11	WSW.	88	A. M. dark and cloudy, with thunder, lightning and rain, at 8 fair moderate breezes, passing clouds.

GHAZEEPORE,
September 14th, 1839.

J. JACKSON,
Civil Surgeon.

* In the Northern parts of the district much more rain fell, both the Coosey and Mahanuddee were uncommonly high for the time of the year.

From Gorruckpoor, in lat. 26° 45′ N. long. 83° 22′ E. I learn by one letter that it blew a gale from the East on the night of the 5th and 6th June; strongly from the East during the 6th, and until the afternoon of the 7th, when it was NE., also blowing strongly; on the morning of the 8th it was NW. strong, and towards the afternoon it shifted to the East and moderated. The rain commenced at noon on the 6th and continued night and day till the afternoon of the 8th, when it ceased.

From Gorruckpoor I have also by the kindness of Mr. Vicars the following memorandum.

Gorruckpoor, 23rd September, 1839.

At the request of Mr. Bridgman, I send you an extract from my Meteorological Journal, it is a very unfortunate circumstance that I should have neglected to register the barometer and thermometer until the 7th of June, I however, noted the direction of the winds and the maximum of the Thermometer, which is better than nothing, and perhaps may answer your purpose; there was a storm from the East with rain on the 31st May.

Yours sincerely,
N. VICARS.

June.	10 A. M.			4 P. M.			Remarks.	
Date.	Bar.	Alt. Ther.	Detch. Ther.	Bar.	Alt. Ther.	Detch. Ther.	A. M.	P. M.
1	Max.	of	ther.	91·0	min.	89·2	Estly. moderate, none.	Easterly.
2	Do.	....	Do.	91·2	....	....	Easterly (minimum of Bar. 28·873)	None.
3	Do.	....	Do.	92·0	....	....	Easterly, moderate.	Storm rain, no wind.
4	Do.	Do.	....	91·5	....	....	Easterly, strong.	Easterly, strong.
5	Do.	Do.	....	88·0	....	....	Easterly, showers.	Easterly, strong.
6	Do.	....	Do.	86·0	....	....	Easterly, stg. hvy. rain (min. of Bar. 28·808)	Easterly, strong.
7	28·970	....	81·0	28·750	....	80·0	Estly. stg. rain all day.	Easterly, strong.
8	28·788	77·5	78·5	28·777	79·5	77·8	Easterly, strong, heavy rain till 4 P. M.	Easterly, strong.
9	28·902	80·7	80·2	28·940	...	84·0	Easterly, strong, cloudy.	Easterly.
10	28·964	81·0	81·0	28·800	82·8	83·0	Easterly, cloudy.	Variable.

From Mirzapore lat. 25° 10′ N. long. 85° 35′ E. I am indebted to Mr. Stuart for the following memorandum of the weather, from 1st to 10th June, 1839.

1st June,	Thermometer,	.. 88·	..	Fresh Easterly Breeze.
2nd ditto,	,,	.. 86·	..	Morning wind Easterly. Noon dreadfully hot and blowing strong from the NW.
3rd ditto,	,,	.. 90·	..	Not a breath of wind, until 6 A. M.
4th ditto,	,,	.. 88	..	Sultry night—strong Easterly wind.

5th ditto,	,,	..	87·	..	Blowing heavy from the East, showers, noon blowing very fresh and weather wild looking.
6th ditto,	,,	..	80·	..	A regular gale from the East with drizzling rain, noon gale increasing and more rain, evening stormy and wet.
7th ditto,	,,	..	80·	..	Severe squalls through the night from the East with heavy and incessant rain, noon blowing heavier, rained more Northerly, evening raining very hard.
8th ditto,	,,	..	80·	..	Very wet morning, cleared up about nine.
9th ditto,	,,	..	80·	..	Gloomy morning with distant thunder.
10th ditto,	,,	..	80·	..	Heavy Squalls through the night, torrents of rain, cleared up at 8 A. M. noon close, calm and sultry.

My attention was drawn to this theory while endeavouring to trace some barometric curve, and some relation between it and the magnetic equator,* and withal some law which might theoretically account for the paraboloidal course of the West Indian and American hurricanes, as shown by Mr. Redfield and Col. Reid; and the singular difference shown by the track of our Hurricane led me to suppose that it might perhaps move in the axis of the parabola? Mr. Ravenshaw's letter shortly afterwards gave much credit to these views, and subsequent facts serve to justify our asserting that for this time at least it has done so.

If we describe, as I have done on the Map No. II, a great parabola, one branch of which stretches towards Ceylon, and the other up to the valley of the Ganges towards Agra, the vortex being towards Arracan, and the axis in the line of the supposed track of the Hurricane; it will be found that the focus of such a parabola falls in about lat. 19° 36′ N. long. 88° 10′ E. which was about the centre of the Hurricane on the 4th. These sort of lines are of course arbitrary, but still the coincidence is novel and curious; whether we look upon the whirls of the Hurricane to have been produced by the mere dynamic action of the streams of air, like the eddies within the bends of a river flowing through a curved channel, or suppose that these vortices are Thermo-electric Phænomena, produced by the sudden transfer of great volumes of the caloric and moisture of the stream of air from the warm equatorial regions to the colder ones toward and beyond the tropics. The remarks on the warmth of the weather in the logs, and the thermometrical

* It may be worth remarking that while this hurricane seems to have travelled from East to West or nearly parallel to the direction of the Magnetic Equator as laid down by Biot, those of the West Indies seem for the most part to come from the South Eastward, which is also there the direction of the plane of the Magnetic Equator. The "Raleigh's" Hurricane in the China Seas seems too to have travelled in this direction.

register, with the peculiar state of the atmosphere so well described in the remarks of Captain Paterson, of the H. C. S. *Amherst*—and her track from Akyab we must remember was almost in the direction of the path of the hurricane till it overtook her at the Sand Heads—are well worth considering.

These are but vague theories, it will be said, but it will not be forgotten that theories on a new subject, like torches in exploring dark caverns often lead us to the passage we seek; though not by the road we expected. "We have only to be ready to lay them aside when they have served our turn,"* and if I venture to introduce this one here it is to point attention to the importance of obtaining electric observations if possible.

The slow rate at which the vortex appears to have travelled also seems to show, as before remarked, that it was, as it were, pent up between the great stream of air blowing along the Arracan range and the Coromandel Hills. We see analogous instances to this in the small bays at the sides of rivers, where while there is one part of the stream turning round the shores of it and another flowing from point to point, we see the eddies are from time to time found almost stationary about the middle of the bay.†

I wish to be understood here however as suggesting probable comparisons rather than advancing a theory.

Col. Reid and Mr. Redfield give from ten to thirty miles per hour for the rates at which the centres of their different vortices have probably travelled onwards. If our centres are correctly laid down; and I think there is good evidence that at least those of the 4th and 5th are so; it appears that from the 3rd to the 4th the Hurricane travelled onwards only about 100 miles, or say 4-16 per hour, and from the 4th to the 5th about 70 or 83 miles per hour. This again is conformable to what we observe in the bends of a stream where the eddies seem to start from some point, and move onwards with more rapidity in the first part of their course than latterly. Should future experience confirm this instance of the slow progress of our Hurricane, it will become an important element in any calculation to be made by the seaman for avoiding their violence.

* Sir John Herschel.

† In the rivers of India banks are often formed at these points, which ending by choking the stream as the river becomes lower, changes its channel in succeeding years.

Practical Remarks and Deductions.

I have quoted at p. 563 an opinion expressed in my hearing, that it was thought by the individual that "they would not make much of it." Few I think who have perused the preceding pages, will be inclined to repeat this, but still as the plain man and the practical seaman may not so readily arrive at *all* the conclusions to be drawn from the knowledge we have collected of this single tempest, I have been induced to sum them up here.

My original intention was to delay doing this, and even the publication of this memoir, until I could collect also what was to be gleaned from the records now existing of our former gales and hurricanes, and then accompany the whole with practical deductions; but it was suggested to me by Professor O'Shaughnessy, that by the delay which this would occasion, we should loose the opportunity of exciting public attention to the subject before the approach of the autumnal gales, and moreover, that even by publishing our knowledge in this yet imperfect state, we might nevertheless, possibly, avert mischief. This I thought sound counsel, and therefore propose to make our former Indian tempests the subject of a future memoir.

It will then be recollected that what is here said is merely the amount of our *present* knowledge, and that what is said is rather meant as a suggestion than as a rule. I shall however distinctly state the grounds from which the various inferences are drawn, and it will be for every man to exercise his own judgment thereupon; I shall also acknowledge when I borrow from Colonel Reid, or other writers.

Clearly to comprehend this theory of gales and hurricanes, let us begin with the *words*. As I have elsewhere said, the words are not to be used so much with relation to the force of the wind in a storm, as to its motion.

A *storm*, or tempest, may mean either a Gale or Hurricane, but it always means a storm of *wind*, and not, as frequently used by landsmen, one of thunder and lightning only; unless so expressed.

A *gale* means a storm of wind, the direction of which is tolerably steady for a long time, sometimes not only for days but for weeks.

A hurricane means a *turning* storm of wind blowing with great violence, and shifting more or less suddenly, so as to blow half or entirely round the compass in a few hours.

With this explanation of our words we shall better understand the things treated of.

The present state of our knowledge seems to show that for the West Indies, Bay of Bengal, and China Sea, the wind in a hurricane

has two motions, the one a turning or veering round upon a centre, and the other a straight or curved motion forwards, so that it is both turning round and rolling forward at the same time. It appears also that it turns, when it occurs on the North side of the Equator from the East, or the right hand, by the North, towards the West; or *contrary* to the hands of a watch; and in the Southern hemisphere, that its motion is the contrary way, or *with* the hands of a watch. The foregoing memoir with the charts and diagrams shew that this rule holds good at least for our storm of June last; and that the wind was really blowing in great circles in a direction as described; i. e. against that of the hands of a watch. We assume then for the present, that the hurricanes in the Bay of Bengal *always* follow this law. We do not yet positively *know* that such is the case, but it is the most probable opinion.

If we describe on a piece of paper a few concentric circles, like those in the diagrams, and marking a little compass with its *fleur de lis* to the North in the middle make four arrows at the top, bottom, and two sides, writing against them as in the diagram, East-wind, North-wind, West-wind and South-wind, and then cut this out with scissors, we shall have what is called a *Hurricane-circle* or *Hurricane-card*.

The use of this is to lay it down upon any part of a chart. We may also cut out a little spindle-shaped piece to represent our ship, and place this in that quarter of the card at which the wind is found.

The card may be supposed to represent a circle of fifty or of five hundred miles in diameter, as we please; and one which would fill up the head of the Bay of Bengal would show, on our map No. II, the wind South on the Arracan coast, East at the Sand-Heads, North on the coast of Coromandel, and West across the Bay.

We have now to judge of three important points, What is the track of the hurricane if it is to be one? In what direction does it bear from us now? How far are we from its centre?

We do not yet know what is the usual track of our Indian hurricanes. We know from Col. Reid's and Mr. Redfield's researches that those of the West Indies begin about the Leeward Islands, travel to the WNW. and then round the shores of the Gulf of Mexico, and following the Gulf Stream, are lost in the Atlantic between the Bermudas and Halifax; and they have investigated a sufficient number to show that this may be taken as a general rule. Those also of the Mauritius seem to come from the Eastward. All we yet know positively here is the course of this single tempest; and hence the great necessity of further observation and research, to which I shall perhaps farther allude. We may however, in the absence of better knowledge, take it as

a supposition, that the hurricanes in the Bay of Bengal travel from the Eastward to the Westward,* and it may be quite safe to calculate upon their blowing in a circle from right to left.

We must then *assume* this point, and supposing we have the wind at ESE. we are then *somewhere* upon the line leading from the NNE. point of the hurricane-circle to its centre.

If the wind now veers to SE. and SSE. we can easily understand that the centre has passed somewhere to the Southward of us, and that we are upon the *right* hand side of its track.

But if the wind had begun at North, and veered to the N. West and West we can also understand that the hurricane is passing somewhere to the Northward of us, and that we are upon the *left* hand side of its path. At what distance we are from the centre can only be judged of by the quickness with which the wind veers round; and it will be clear that if a ship stood exactly still with the hurricane coming direct towards her, she might have the wind always in one direction till the centre passed her, when she would probably have a shift exactly in the opposite direction.†

The seaman will now understand how it is that he may be running into a Hurricane or scudding in company with one—which no one of course desires to do—and how important it is that a knowledge of their usual paths should be obtained; for they seem to have in all countries tracks which we may call their usual paths.

As an example how a vessel may run into a hurricane, let us suppose upon our Chart, the Amherst, bound across the Bay from Chittagong to Coringa. It is clear that her course then lies across the track of the Hurricane, and that, if ignorant of what we now know, she might with a little alteration of time, and tempted by the fine Easterly Gale, run into the middle of it; for till now, though a falling Barometer would teach the seaman that he was to expect a tempest, he was quite ignorant, or had only some general rules derived from very partial experience, to inform him where it was beginning, how it would blow, and how he could escape it. We shall know this as I have said before, when we know the usual path of our Indian Hurricanes.

* In an able review of Col. Reid's work in No. 23 of the *Madras Journal of Literature and Science* by T. G. Taylor, Esq. H. C. Astronomer at Madras, he says, "The East India Gales appear invariably to travel from the coast of Arracan towards the West, the curves conforming gradually to the slope of the shore until in about the latitude of Madras when their course is due South, after which the curve binds again towards the West, the violence of the storm seldom extending below Cuddon or Porto Novo." Mr. Taylor speaks here of a *gale*. He does not observe that he has described the curve which a hurricane (i. e. a turning gale) would make on three sides of its circle.

† Col. Reid, p. 8.

The question of scudding or heaving to must it is evident depend upon the commander's judgment as to the position in which he is, his sea-room and the like; but the tack on which he ought to heave to is so clearly indicated by Col. Reid's directions that I cannot do better than extract them; he says page 425,

"*Rules for laying Ships to in Hurricanes.*—That tack on which a ship should be laid to in a hurricane has hitherto been a problem to be solved; and is one which seamen have long considered important to have explained.

"In these tempests when a vessel is lying to and the wind veers by the ship's head, she is in danger of getting stern-way* even when no sail is set; for in a hurricane, the wind's force upon the ship's masts and yards alone will produce this effect, should the wind veer ahead, and it is supposed that vessels have often foundered from this cause.

"When the wind veers aft as it is called, or by the stern, this danger is avoided, and a ship then *comes up* to the wind instead of having to break off from it.

"If great storms obey fixed laws, and the explanation given of them in this work be the true one, then the rule for laying a ship to follows like the corollary to a problem already solved. In order to define the two sides of a storm, that side will be called the right hand semicircle which is on the right of the ship's course, as we look in the direction in which it is moving, just as we speak of the right bank of a river. The rule for laying a ship to will be, when in the *right-hand* semicircle to heave to on the *starboard* tack, and when in the left-hand semicircle on the larboard tack in both hemispheres."

As an example of this on our own diagram. If a line be drawn across those of the 4th and 5th N. 76° E. and S. 76° W. or about WbS. ½ S. and EbN. ½ N., which is the track we have supposed for the hurricane; it will be seen that all the vessels above it, or to the right hand of the hurricane's path, had the wind veering from NE. to South, and were thus safe upon the starboard tack, and all

* From being taken aback. This taking aback in a tempest we all know to be most dangerous, not only on account of the getting stern-way here mentioned; being pooped, dismasted, and the like; but from another danger which is not sufficiently adverted to I think; and this is, that a vessel, may in one of the terrific gusts which accompany these sudden shifts of wind be thrown on her broadside in the trough of the sea *with her deck towards the sea!* In such a case she is in the position of a vessel on a reef which has fallen over to seaward; and there is every chance that her hatches would be beaten in; which would swamp her. A parallel case to this is mentioned in Col. Reid's work, page 221, of the H. C. S. Diana, when part of the upper fore-hatchway was stove in by the weight of the water above it, and the vessel nearly swamped in consequence. Hatches, particularly those of the upper deck, should not only be made stouter then they usually are (they might for lightness be lined with sheet copper or iron) but moreover two extra strong fore and aft-pieces should be made to ship parallel with the middle piece, halfway between it and the side, so as to afford additional support in cases like this. I shall be told that we know of very few instances of this accident. This may arise from few escaping to tell the tale. The number of well-found, stout ships, ably manned and commanded, which disappear induce us to believe that, apart from fire, there are storm-dangers which we can only guess at. I think this may reasonably be supposed to be one of them. H. P.

those below it,* or on the left hand side, had the wind veering from N. to SW. and were thus safe on the larboard tack. The vicinity of the shore, or the necessity of wearing to ease the masts, if the rigging has stretched too much upon one tack, may oblige the seaman to vary from this rule; and close to the centres of the hurricanes anomalies may be found; but it will be seen at once, I think, without further explanation, of what great value it must ultimately prove to him.

I annex here a public order recently issued by the Government of India, and a memorandum by the Lords of the Admiralty and by Lord Glenelg, which will assist in shewing both the seaman and landsman what we require in the way of information on this subject.

Calcutta: Wednesday, 11th September, 1839.—NOTIFICATION.—The importance of investigating the course and Phænomena of Storms has been brought to the notice of Government by the Hon'ble Court of Directors; and the Hon'ble the President in Council is in consequence desirous of obtaining local Registers of these Phænomena taken simultaneously at as many stations of India as may be found possible. The public Officers of the different settlements and stations of India are accordingly invited and requested, upon the occurrence of any Hurricane, Gale or other Storm of more violence than usual, to note accurately the time of its commencement, the direction from which the wind first blows, whether in gusts or regular, and whether accompanied with rain, thunder and lightning or other Phænomena. Also to note, with as much accuracy as possible, the changes of direction in the wind, and the time of the occurrence of each, and lastly, the duration of the Gale and in what quarter the wind is when it ceases. The variations of the Thermometer and Barometer at each period noticed will also be of importance if the means are forthcoming of making such observations.

The President in Council refrains from making it the business of any particular Officer to note the above circumstances, but relies on the known desire of all enlightened persons to promote objects of scientific and useful enquiry that the public Officers will arrange in such manner as to ensure that the observations will be taken by some one in the vicinity of each station.

Reports upon matters of the description comprehended in this Order may be forwarded to the Secretary to Government in the General Department, free of postage, (superscribed "Storm Report.")

A scientific gentleman in Calcutta has obligingly undertaken to combine all reports that may be so received into a synopsis for exhibition of the results in the manner adopted and recommended by Colonel Reid, R. E.

By Order of the Hon'ble the President of the Council of India in Council.

H. T. PRINSEP,
Secy. to the Govt. of India.

* The places of the Justina and Eden, by an oversight, are unfortunately omitted in the diagram of the 5th. It will be seen that they had the wind at SW. and SWbW. on that day.

MEMORANDUM.

Admiralty, Dec. 28th, 1838.

The Lords Commissioners of the Admiralty having had under consideration the general utility of recording with clearness and precision, in the log books of all Her Majesty's ships and vessels of war, the actual state of the winds and weather, have thought fit to order that henceforward in each page of the log book two columns should be introduced, wherein the force of the wind and the appearance of the atmosphere, shall be every hour registered according to the annexed scheme, a copy of which shall be pasted into each book, and painted on the back of every log board or log slate: and two more columns shall likewise be given for the purpose of entering the heights of the barometer or simpiesometer, and thermometer, when such instruments may be on board.

By command of their Lordships,

C. WOOD.

To all Captains, and commanding officers of Her Majesty's ships and vessels.

FIGURES TO DENOTE THE FORCE OF THE WIND.

0 denotes Calm.		
1 Light Air, ...	just sufficient to give	Steerage way.
2 Light Breeze, . .	with which a well-conditioned man-of-war, under all sail, and clean full, would go in smooth water, from	1 to 2 knots.
3 Gentle Breeze, . .		3 to 4 knots.
4 Moderate Breeze,		5 to 6 knots.
5 Fresh Breeze, . .	in which the same ship could just carry, close hauled, . .	Royals, &c.
6 Strong Breeze,		Single-reefs and top-gallant sails.
7 Moderate Gale,		Double reefs, jib, &c.
8 Fresh Gale, ...		Triple reefs, courses, &c.
9 Strong Gale, . .		Close reefs & courses.
10 Whole Gale, . .	with which she could only bear	Close reefed main top-sail and reefed fore-sail.
11 Storm, ...	with which she would be reduced to	Stay-sails.
12 Hurricane, . .	to which she could shew . .	No canvas.

LETTERS TO DENOTE THE STATE OF THE WEATHER.

b Blue sky—whether with clear or hazy atmosphere.
c Cloudy—*i. e.* Detached opening clouds.
d Drizzling rain.
f Fog—f thick fog.
g Gloomy dark weather.
h Hail.
l Lightning.
m Misty or hazy—so as to interrupt the view.
o Overcast—*i. e.* The whole sky covered with one impervious cloud.
p Passing showers.
q Squally.
r Rain—*i. e.* Continuous rain.
s Snow.
t Thunder.
u Ugly threatening appearance in the weather.
v Visibility of distant objects—whether the sky be cloudy or not.
w Wet dew.
. Under any letter denotes an extraordinary degree.

By the combination of these letters, all the ordinary phænomena of the weather may be recorded with certainty and brevity.

EXAMPLES.

b c m Blue sky, with detached opening clouds, but hazy round the horizon.

g v Gloomy dark weather, but distant objects remarkably visible.

q p d l t Very hard squalls, and showers of drizzle, accompanied by lightning, with very heavy thunder.

Nautical Magazine,—March, 1839.

Memorandum respecting the Records to be kept of the state of the Weather in the British Colonies.

The Captains of Ports, Harbour-Masters, and Keepers of lighthouses, or, where those officers do not exist, some other competent public functionary, should be required to keep journals of the weather, on the principle of the log books of ships. A column should be specially reserved for inserting the height of the barometer. Under the head of 'Remarks,' should be entered all meteorological observations considered worthy of particular notice. When the keeper of a journal may hear that a vessel has encountered a storm, he will enter in it any information on the subject which he can rely on, together with the name of the ship, of her owner, and of the port to which she may belong. With the view of tracing the course of storms, the Trinity Board of London have given directions for the adoption of measures to obtain a more accurate record of the weather, than has hitherto been kept, at the lighthouses of Great Britain and Ireland. The keepers of these lights having the opportunity of taking their observations by night as well as by day, great advantage may be derived from employing them in this manner. Officers in charge of Colonial lighthouses should be instructed to keep similar journals. In noting the wind's force, both in the Harbour-Master's journals and in the lighthouse reports, it is desirable that the officers should adopt the numbers for

noting the strength of the wind now in use at Greenwich Observatory, and about to be introduced at the lighthouses under the Trinity Board. In the cases of St. Helena and Ascension, it is desirable that more precise information should be obtained by observation, respecting the 'Rollers' at those islands. As the object of H. M's. Government in instituting these inquiries is the advancement of knowledge in science generally, the Governors of the several British Colonies will consider how far it may be in their power to obtain useful information bearing on the subject, from countries adjoining to their Governments in the possession of foreign powers, or how far it may be useful to the study of meteorology, to exchange the observations made within their Governments, for those of other countries in the neighbourhood. If at any time desired, there would be no objection to the publication in the Colonial newspapers of extracts from the journals.

(Signed) GLENELG.

There is little to be added to these ample directions, but I may be allowed here to repeat what has been said in another place,*—that every European in India, may be said to have a direct personal interest in this matter; for, though unconnected with commercial speculations, he probably looks one day to cross the ocean himself on his return home; or has those who are dear to him doing so; or he may be sent to sea for his health. It is superfluous to allude here to that general interest which the feelings of humanity must awaken in every man's mind when he hears of a new branch of knowledge, which may so much contribute to disarm the tempest of its terrors; and which careful, common-sense accounts of storms may so very essentially assist us in perfecting.

In closing this first memoir, which, in the absence of abler labourers in the field, I propose to follow by others as I can find materials, I ought to apologize for its imperfections. I have mentioned in Part I. some of the difficulties I experienced in collecting information, and that, by the advice of a friend, I published earlier than I originally intended, to attract attention to the October Gales. When I add to this, that I am far from being master of my own time, I trust due allowance will be made for its defects, by those who are not aware of these circumstances. To solicit information on any question of natural history is often fruitless enough in all countries, but upon meteorological questions, and in India, where the public mind has not yet been roused to attention on this head, and where observers are so few, is absolutely at times, to use a Gallicism, *désespérant*. I trust however this little essay will shew how much every trifle, insignificant as it

* Englishman, 17th September, 1839.

might be thought by the possessor, may contribute to the end we seek. Mr. Hudson's valuable barometrical observations on board the Hope Floating Light, I have alluded to at p. 589; and I may state here, that those of the Hurricane of October, 1832, quoted by Col. Reid p. 269, as taken at Chandernagore, are my own; and both prove to be of far more utility than was at the time supposed by the observers. We may indeed, if allowed to speak metaphorically on such a subject, say, that as the great pyramids of human knowledge must be built of separate stones, no man can say, before he brings his to the builder, that it may not become "the head stone of the corner!"

ART. III.—*Extracts from Mr. M'Clelland's paper on Indian Cyprinidæ. As. Res. Vol.* xix. *Part* II.

For such of our readers as do not subscribe to the Researches of the Society, we take this opportunity of extracting such parts of the 2nd part of the 19th vol. just published, as may be separated, without disadvantage from the rest of Mr. M'Clelland's paper. The utility of Ichthyology is set forth in the following remarks.

"Utility will always be found to depend more on the degree of attention paid to any subject connected with science, than on the nature of the subject itself; yet it is a common remark that this, or that, is important or frivolous, according as we happen to be acquainted with it. When we find any branch of science regarded as useless, we may be assured that, contrary to ordinary expectation, it will prove the most productive field we can enter. Science, indeed, can only be useful where it has been cultivated, and its principles worked out; practical results will then follow in proportion to the pains taken to develop them.

"The moral interest of Ichthyology having been sufficiently attended to throughout the preceding paper, I shall here pass it over, merely remarking, that in common with other branches of natural science it is calculated to improve the mind as well as the condition of society, while its cultivation need not interfere with any duty, public or private; and few who are placed on our coasts, or on the banks of any of the noble rivers of India, who might not with amusement to themselves, and advantage to science, communicate many observations no-

where else to be collected regarding our indigenous species. The season of spawning, and places to which the various species resort for this purpose—their food—the kind of waters in which they thrive best—whether running or stagnant—with sandy or with muddy bottoms,—would all be points of great interest that might be settled by persons of no pretensions to a scientific knowledge of the subject.

"With regard to the propagation of fishes, Mr. Yarrell remarks—that an acre of water will let in many parts of the continent, where fresh water fishes are in more request than in England, for more than an acre of land. In no part of the continent of Europe, however, can fresh-water fish be of so much importance as in India, where most of the domestic animals which in Europe afford the principal food, as the ox, swine, poultry, &c. are rejected by a large proportion of the people.

"Throughout the Mysore country, as well as in many of the western provinces, large tanks or reservoirs occur, many of them from three to thirty miles in circumference, and being indispensable for irrigation, may be supposed to be nearly universal in all populous districts not watered by rivers. These reservoirs are considered by the Hon'ble Colonel Morison C. B.* as among the greatest national monuments to be found in India.

"They are capable, according to Buchanan,† of supplying water for from eighteen months to two years, and thus of maintaining the surrounding crops should no rain fall within that period.

"They are drained by an ingenious system of sluices and aqueducts of the most simple, but complete construction, which afford a perfect control over the distribution of the water. During the dry season they are all pretty much exhausted, and may, if necessary for repairs, be left perfectly dry. This would afford an excellent opportunity for destroying crocodiles and all the various destructive fishes, sparing only the more profitable kinds, which are limited to two or three species only; and by repeating this operation for several seasons, or as often as may be necessary, all but those we wish to propagate would soon be exterminated.

"By a wise law of nature, the carnivorous animals of every class are less prolific than the harmless, and may therefore be the more easily subdued. Nearly all the destructive fishes are viviparous, bringing

* To whom I am indebted for many particulars regarding them.

† See his Journey in Mysore.

forth comparatively few young; whereas, the more profitable kinds, or those which should be the object of our care, are all oviparous, and bring forth their young from spawn.

"A single female Carp weighing only nine pounds has been found by Bloch to contain no less than six hundred thousand ova; and by Schneider, one, ten pounds weight, was found to contain seven hundred thousand ova, or eggs.

"The fecundity of the *Ruee*, *Catla*, and *Mrigala*, has not yet been ascertained, but from their close affinity to the Carp we may suppose them to correspond in this respect with that species; the question however, is one that may be easily ascertained by weighing a grain of the roe and ascertaining the number of globules it contains, while these will be to the whole roe what one grain is to its entire weight. The result will show that these species are capable of yielding, by their extraordinary fertility, a source of food as inexhaustible as the sands of the ocean, could we only bring their propagation and the safety of the young sufficiently within our control.

"In the reservoirs above described, we have every facility for effecting this object on a scale of great magnitude, without in any way interfering with the other uses of the water.

"There are certain kinds which though they cannot be said to be carnivorous, would yet be still more fatal to our object by devouring the spawn or ova, such are the Barbels, common in the higher parts of our rivers, and which but for a knowledge of this trait in their character would, from their appearance and flavour, be the first we should recommend for propagation, and thus from an ignorance of one simple fact, destroy every chance of success. We should not, however, condemn all the Barbels merely from a fault in some of the species, the circumstance should impress on our minds the necessity of confining the varieties of fish in a single reservoir to the lowest possible number of herbivorous kinds, such as the three I have mentioned, namely, *Cyprinus rohita*, Buch. *Cyprinus catla*, id. and *Cyprinus mrigala*, id.; there is reason to believe that either of these species would answer equally well in any part of the plains of India. As they usually attain a large size, they may be slow in coming to perfection, and, therefore, instead of having these three large species in the same water, it would probably answer the purpose better to have one of them only as a principal species, with any one of the common Gudgeons or Bangons of India as a cheaper article, which would

not require more than a year or two at the utmost to arrive at perfection. Beyond a single species of *Gobio*, and a single one of the larger species already mentioned, more ought not to be introduced to the same water, or allowed to exist in it, from the danger of their proving inimical to each other, a point which I presume has never been attended to sufficiently in attempts hitherto made to propagate fishes; hence, perhaps, the want of that degree of success which no doubt would have rendered a practice so simple and beneficial, long since universal.

"The only alteration in the present form of the reservoirs, to adapt them to the purposes in view, would be to enclose the lowest portions of the bottom of each with stakes long enough to reach above the highest surface of the water, and close enough together to prevent the entrance of crocodiles, otters, and the like, should any such exist in the neighborhood. The spawning season of the *Ruee* and other Cirrhins, appears to be in the dry weather; the contrivance here suggested would therefore protect them at that time, and if there should be any danger of the whole of the water drying up, wells of sufficient size and depth might be formed within the enclosure, to which the fishes would retire during droughts, while the shallow waters around the wells would afford space enough for the deposit of spawn.

"Much of our success would depend on keeping these enclosures as free as possible from all but the species we desire to propagate. At the commencement of the dry season, before the fish begin to enter the enclosure, the interval between the stakes might be closed with straw, and as the water becomes sufficiently low without, most of the rapacious kinds may be removed or destroyed; none should be allowed to remain, but that species alone which may be the object of our care. This done, the only further attention necessary, would be to save the fish in the enclosure from birds during the remainder of the dry season.

"Should our success be complete, from every moderately sized female *Ruee* we should have on the commencement of the rains from five to ten hundred thousand fry, which, as the waters rise would be quite able to take care of themselves till the next season, when it would be necessary again to destroy the rapacious kinds, as before.

"The repair of the *carays** of Mysore, is said by Buchanan, to be

* Such is the name by which the reservoirs are known in Southern India when kept up for irrigation.

attended with considerable expense, nevertheless it is understood to be an indispensable object to have them in perfect repair, since the fertility of the country depends entirely on them. The plan here proposed of converting them to new purposes of utility would add to their importance, and the interest of keeping them up, without in any way increasing their expense.

"On the fishes of Bengal, Assam, and other provinces subject to the inundations of the larger rivers, we can exercise no control, nor is it desirable that we should, even if it were in our power, the supply of fish being plentiful and constant enough: but in the higher parts of the plains, near the foot of the mountains where the larger Cirrhins and Barbels retire during the dry season for the purpose of spawning, fisheries might be carried on with advantage to a considerable extent.

"It would here be out of place to enter on the subject of sea fisheries, and before we could do so with advantage it would be necessary to pay as much attention, or more, to the fishes of our coasts as we have devoted to those of our rivers.

"Already we have attained one important piece of information regarding the value of the *Sulea* fish of our estuaries, *Polynemus sele*, Buch., which from the earliest times has been celebrated throughout China for its isinglass. This substance was formerly supposed to be afforded only by certain fishes in the rivers of Muscovy, from whence it was exported to all parts of Europe, where, from its high price, its use is chiefly confined to the arts.

"A solution of this substance mixed with Canadian balsam and spread on black silk forms the useful article called court plaster. A few grains of isinglass boiled in milk forms a most nutritious food, which is given medicinally.

"Ignorant of its abundance in certain fishes of the Hoogly, that used by the English residents in India is still imported, probably at an expense of about 800 Rs. per maund,* while the same thing is collected in abundance and shipped to China from the Calcutta river.†

"Ten grains of this substance is sufficient to give the consistency of jelly to a pint of water, and as it keeps good in a dry state for any length of time, we may imagine its value as a portable food, and what its importance might be in times of scarcity, since one pound avoir-

* It is retailed in Calcutta at a much higher rate.

† See Journal of the Asiatic Society for March, 1839.

dupois, at the above rate, would afford a nutritious meal to 1560 persons.

"Whether it be used in times of scarcity in China I do not know, but probably it is collected and stored to meet such occasions, since Dr. Lumqua—an honorary member of this Society—a Chinese Physician, long resident in this city informs me that the Bengal *fish-sago* procured from *Polynemus sele*, Buch. is known throughout the empire, and that nothing could surpass his surprise on his arrival nearly twenty-five years ago in Calcutta, when he found that with the exception of his own countrymen who carried on the trade, no one appeared to know or care anything whatever for the article in question, and as no one could describe the fish, the same ignorance continued up to within the last few months to prevail on the subject. The advantage, however inconceivable, of an abundant supply of any substance, a single maund of which would afford a nutritious meal to upwards of one hundred thousand persons, could only be felt occasionally, but the intrinsic value of the article in all the common conveniencies of life, is eminently calculated to direct attention to other uses of the species affording it.

"This is one of the largest and finest fishes, both as regards flavour and wholesomeness, on our coasts or in our rivers, while the season at which it is taken is the one most favourable for a residence in boats or ships in the Sunderbuns. Under these circumstances it is not likely that the subject of sea fisheries in this quarter will be altogether overlooked, longer than the circumstances on which their success must depend shall have been properly examined.

"All sea fisheries are practised on migratory species, which advance annually at stated periods in search of food and proper situations to deposit their spawn. Their progress is so regulated that at certain seasons they approach the different coasts, in their course, with so much regularity as to enable the people to repose as much confidence and hope in their coming and departure as they usually place in the ripening of their crops. The shoals of fishes are so dense as to cover the sea for leagues without interruption, and extend to a solid depth of many fathoms in some instances, so that they are taken as quickly as it is possible to salt and barrel them. The season lasts from a month to six weeks, when thousands of ships are laden with cargoes which are to serve as the common stock of food for many of the surrounding nations for twelve months, when the fishing is recommenced.

"Such are the fisheries on the banks of Newfoundland, on the coasts of Norway, Sweden, and Great Britain; and unless the coasts of India

afford promise of resources of similar extent and importance, the object would hardly require much public attention. If, however, it be found that we have species on our coasts equal in every respect to that which is the object of enterprize at Newfoundland, and that these advance into the Sunderbuns at a season when ships and men without number may be employed with safety, there can be nothing to prevent the national importance of the circumstance.

"In this instance, as well as in that of the propagation of fresh-water species, science, while it exhibits varieties as numerous almost as the stars, teaches us at the same time how to strip the subject of vagueness arising from this cause, and amidst the countless species which inhabit our seas, directs our attention and our energies to a few only, and of these the *Sulea*, or *Polynemus sele*, Buch. is the one which from its bulk, its habits, and its qualities in every way seems capable of becoming a permament benefit to society. It appears to be the Cod-fish of the tropics, and equals its representative in the northern seas in all those qualities which render that species so invaluable; but from its bulk it is unmanageable by the Indian fishermen, who are also without the means of preserving it.* These however are not sufficient reasons why an article that might add an exhaustless supply to the common stock of food should be altogether lost, now that an European spirit, under the influence of a paternal government, begins to infuse itself in all things connected with the resources of India. *As. Res. vol.* 19. *p.* 457—464.

* It must have been long known that the difficulty of preserving meat depends more on the state of the atmosphere in regard to electricity and moisture than on temperature. In Calcutta, in the month of December, when the mean temperature is about 60°, it is not uncommon to keep meat before it is dressed for eight days, though in England during the summer at the time of herring fishing too, it cannot be kept in the best meat-safes for more than half that time, though the temperature be lower than here. With salt and other means at hand, I conceive there would be no difficulty in curing fish in an Indian climate in the months of November and December, when the *Sulea* fishing would be carried on; nevertheless the subject is one of much interest, and I cannot therefore omit the following remark with which I have been favoured on this head by Mr. C. K. Robison, one of the Magistrates of Calcutta. "It would be a famous thing if these enormous fish (the *Sulea*) could be cured, as well as their isinglass obtained; and I cannot help thinking the measure very feasible, if the fishermen at the time of taking them and cutting them up, dipped them first into weak chloride of soda mixed with a small quantity of impure pyroligneous acid. This would not only preserve the fish till the salt acted, but improve the flavour." These materials could be manufactured at a very cheap rate on the spot, as well as every thing else that would be requisite. For an account of the *Sulea* fish, see Journal Asiatic Society Bengal, March 1839, p. 203. Also an article on "some Indian Fishes by Dr. Cantor," Proceedings Royal Asiatic Society, April 1838. *As. Res. vol.* 19. *p.* 464.

"*Cyprinidæ*, of all fishes of equal importance are those that appear to have occupied least, the attention of naturalists; a circumstance the more curious, as in consequence of their being peculiar to fresh waters, they are more universally distributed in the interior of continents, where they ought to be more familiar and useful to man than any other family of the same class.

"Regarding their distribution, little has hitherto been made known. It would not appear that there is any one species common to Europe and America; it is not however to be supposed that we are yet prepared to form an accurate comparison between the *Cyprinidæ* of the old and new worlds, since the majority of species in either seems as yet to be but ill defined. Nor is it to be supposed that ichthyology has yet been prosecuted in America to an extent at all likely to make us acquainted with the numerous species that must inhabit the extensive lakes and rivers of that continent. Of African species few only are referred to by Cuvier, while the Nile is known to present some species that are not found in the south of Europe. The Chinese species may yet be said to be almost unknown, with the exception of a few determined by Cuvier from the very doubtful data afforded by paintings; although it is seldom that so favourable an opportunity is afforded for collecting information on any branch of natural history, as that which the British embassies in China possessed, for investigating the peculiarities of the fresh-water fishes of that empire, from the length of time they passed in boats on some of the principal rivers. Nor is any thing whatever known, as far as I am aware, of the existence of Cyprins in New Holland or any of the Polynesian Islands. In India the fishes of several of the great rivers yet remain to be investigated, as those of the Irrawaddi, the Indus, and the Nerbudda. A collection of drawings of the fishes of the Indus, prepared during a scientific mission under Capt. Burnes, has recently been deposited in the museum of the Asiatic Society; and Mr. Griffith, to whom every branch of science is as dear as the one in which he is fast rising to the highest station, is now engaged in making extensive collections of, and observations on, the fishes of the same river. The museums of Paris must already be well stored with Indian species collected by Messrs. Duvaucel, Jaquemont, and De-Lessert, but I doubt if any of our British museums contain many of the commonest species of the Ganges.

"Natural history is now assuming a station so important in the highest scale of intellectual pursuits, that any remarks at all calculated to impress on the minds of those who are connected with missions into

new countries a lively sense of the interest that attaches to its most minute details, will not, we may be assured, be taken amiss. Information however carefully collected on such occasions as those referred to, becomes comparatively useless when unaccompanied with specimens of the things to which it relates. We should ever recollect that the easiest and best way to promote our own fame, and contribute at the same time to the advancement of natural history, is by making collections, nor are we without examples of the highest awards having been, though somewhat prematurely, conceded to collectors. Nevertheless, to render collections of the highest degree of real value in the present advanced state of science, those who make them should gather at the same time as much information as possible regarding the circumstances under which the various objects comprised in them live, or occur; and it is in this that the intelligence of the naturalist may be best and most profitably displayed during his journies in new countries.

"The following tabular view of the distribution of *Cyprinidæ*, though avowedly imperfect, will serve to show how the leading groups are generally dispersed. Cirrhins, for instance, appear to be peculiar to India, or at least to the tropical parts of Asia, and the Catastoms to America; while both are represented in Europe by the true Carps. From the number of Gangetic species, the Barbels like the Cirrhins would seem to have their metropolis in India, from whence the genus is extended over the Caspian Sea, and the Nile into Europe.

"The Gonorhynchs would also seem, as a group, to be natives of the East, one species only having been found in South Africa, none in Europe, and eleven in India.

"The greater part of the *Sarcoborinæ* are probably also Eastern fishes, with the exception of the Breams and Lenciscs, although some of the European forms set down under the latter genera may be found to belong either to the Perilamps or Opsarions.

"The small sub-genera of *Pœcilia* appear to be equally distributed in all parts of the world, one having been already found in Africa, two species in India, where a few more may be expected, seven species in America, and seven in Europe; but in every case the species of one continent have been found to be distinct from those of another.

"The Loaches (*Cobitis prop.* Lin.) afford another instance of the concentration of numerous species in India, while three only are found in Europe, and none whatever in America. The annexed table exhibits the general distribution of the family.

"GENERAL VIEW OF THE DISTRIBUTION OF CYPRINIDÆ

Family.	Sub-fam.	Genus.	Sub-gen.	Europe.	America.	Asia. India.	Asia. China.	Asia. Caspian.	Africa.	Uncertain.	Total.
Cyprinidæ *Cuv.*	Pæonominæ *McClell.*	Cirrhinus *Cuv.*		—	—	13	—	—	—	—	13
			Labeo Cuv.	—	2	1	—	—	1	1	5
		Catastomus *Leseur,*		—	19	—	—	—	—	—	19
		Barbus *Cuv.*		4	—	11	—	2	1	—	18
			Oreinus *McClell.*	—	—	4	—	—	—	—	4
		Cyprinus prop. *Cuv.*		6	—	4?	4?	—	—	—	14?
		Gobio *Cuv.*		2	—	16	—	—	—	—	18
			Tinca *Cuv.*	1	—	—	—	—	—	—	1
		Gonorhynchus *Gron.*		—	—	10	—	—	1	—	11
	Sarcoborinæ *McClell.*	Systomus *McClell.*		—	—	12	—	—	—	—	12
			Abramis *Cuv.*	5	1	1	—	—	—	—	7
		Rhodeus *Agass.* } Apius *Agass.* }	*Fossil Genera* in the lacustrine deposit of Œningen.								
		Perilampus *McClell.*		—	—	12	—	—	—	—	12
		Leuciscus *Klein.*		13?	4?	9	—	—	—	—	26
		Opsarius *McClell.*		—	—	12	—	—	—	—	12
	Apalopterinæ *McClell.*	Pæcilia *McClell.*	Pæcilia prop. *Schn.*	—	4	—	—	—	—	—	4
			Lebias *Cuv.*	1	—	3	—	—	—	—	4
			Fundulus *Lacèp.*	5?	2	—	—	—	—	—	7
			Molinesia *Leseur,*	—	1	—	—	—	—	—	1
			Cyprinodon *Lacèp.*	2	4	—	—	—	—	—	6
			Aplochelus *McClell.*	—	3	—	—	—	—	—	3
			Anebleps *Bl.*	—	—	—	—	—	1	—	1
		Platycara *McClell.*		—	—	3	—	—	—	—	3
		Psilorhynchus *McClell.*		—	—	2	—	—	—	—	2
		Cobitis *Lin.*	Cobitis propria *McCl.*	2	—	12	—	—	—	—	15
			Schistura *McClell.*	—	—	11	—	—	—	—	11
				42	37	139	4	2	4	1	229

"The American species of this family referred to in the Regné Animal, only amount to thirty-three, but Dr. Richardson in his report on North American Zoology mentions nearly as many more, imperfectly indicated by Rafinesque Smaltz, and other writers as belonging to the rivers and lakes of the new world;* still however the preponderance of species in favour of India is so remarkable, that it is only by extending our consideration to other genera of the order *Malacopterygii abdominales* that we find the equilibrium restored in the distribution of fresh-water fishes. Thus the *Salmonidæ* which form a large proportion of that order in the rivers of both Europe and America, are in India quite unknown, not one species of that extensive family having

"* I have not yet seen the volume of *Fauna Boreali Americana* by Dr. Richardson, which is devoted to Ichthyology, the volume on Birds being the only part of that important work which has reached India.

yet been found in this country, where the blank appears to be filled up by the excessive development of the *Cyprinidæ*.

"One species of Tench,* four Leuciscs,† and one Gudgeon,‡ are enumerated among the fossils of Œningen by M. Agassiz, who also describes two new genera ‖ *Rhodeus* and *Apius*, nearly allied to, but distinct from the Perilamps and Systoms. They are distinct from the first, by the dorsal and ventral margins being equally arched, and the caudal and anal fins being less developed; and from the second, by the absence of spines in either of the latter fins; both belong however to *Sarcoborinæ*, and will serve to render that group far more complete than it appeared to me to be before I saw M. Agassiz's splendid work. Two fossil species of *Cobitinæ* are also found in the same locality, one of these, *C. cephalotus* Agass. belongs to *Schistura*. The marlstone in which these remains are found is justly considered by M. Agassiz to be a lacustrine deposit, and supposed to be coeval with the molasse of Switzerland and the sand stone of Fontainbleau, and consequently to correspond with the miocene or early tertiory period." *Op. cit. p.* 257—262.

As a specimen of the manner in which the subject is treated we shall here give from the synopsis of his paper one of the three sub-families into which Mr. M'Clelland has separated the Cyprins; on a future occasion we may quote the two remaining sub-families, from the same part of the work. *p.* 264—283.

"1. SUB-FAM.—PÆONOMINÆ.§ J. M.

"CHAR. Mouth slightly cleft, either horizontal or directed more or less downward. The stomach is a lengthened tube continuous with a long intestinal canal. Colours plain. Three rays in the branchial membrane.

"OBS. They occur only in fresh-water, and comprise a large proportion of the fishes of lakes and rivers, more especially those that are of economical importance. Their food consists chiefly of confervoid plants and other productions of the vegetable kingdom.

* *Tinca leptosoma*, Agass. *Recherches sur les Poissons Fossiles*, vol. v. t. 51.

† *Leuciscus papyraceus*, Agass. V. t. 36. *P. leptus*, Agass. V. t. 57. *L. pusillus*, id. l. c. *L. œningensis*, id. and *L. heterurus*, id. l. c.

‡ *Gobio analis*, Agass. t. 57.

‖ *Rhodeus elongatus*, Agass. t. 54. and *R. latior*, id. l. c. Of the genus *Apius*, M. Agassiz describes *A. gracilis*, and *A. brongiarti*, V. t. 55.; but the latter as well as *Leuciscus papyraceus* are from the lignites of Mènat.

§ From *Poionomos*, that feeds on herbs.

"I. Gen.—CIRRHINUS.

"Char. Lower jaw composed of two short limbs loosely attached together in front, where instead of a prominent apex, there is a depression; lips soft and fleshy with four cirri,* dorsal without spinous rays.

"Obs. This genus would seem to be represented in America by the *Catastomi* of Leseur, and in Europe by *Cyprinus proprius*, Cuv. In India it affords several of the most favourite, abundant, and wholesome species.

Spec. C. macronotus, J. M. t. 41. f. 1.

Length of the head to that of the body as one to four; forty-one scales along the lateral line, and thirteen in an oblique line from the base of the ventrals to the dorsum. D.23 : P.16 : V.9 : A.7 : C. 19.

Hab. Assam and North-eastern parts of Bengal, where it attains from two to three feet in length.

Spec. C. nandina, Buch. P. G. † t. 8. f. 84.

Length of the head to that of the body as one to three; forty-four scales along the lateral line, and twelve in an oblique line from the base of the ventrals to the dorsum. D.26 : P.16 : V.9 : A.7 : C.19.

Hab. Bengal and Assam.

Spec. C. calbasu, Buch. P. G. t. 2. f. 33.

Length of the head to that of the body as one to four and a half; forty-two scales along the lateral line, and fourteen in an oblique line from the base of the ventrals to the dorsum. D.15 : P.17 : V.9, or 10 : A.8 : C. $\frac{10}{9}$.

Variet. Forty-two scales along the lateral line, and fifteen in an oblique line from the base of the ventrals to the dosum. D.16 : P.15 : V.9 : A. 5 : C. $\frac{9}{10}$

Hab. Bengal and Assam.

Spec. C. rohita, Buch. P. G. t. 36 f. 85.

Length of the head to that of the body somewhat less than one to three; forty-two scales along the lateral line, and twelve in an oblique line from the base of the ventrals to the dorsum. D.15 : P.16 : V.9 : A.7 : C. $\frac{10}{9}$.

Variet.‡ t. 41. f. 2. Forty-three scales along the lateral line, and thirteen in an oblique row from the base of the ventrals to the dorsum. D.15 : P.16 : V.9 : A.8 : C.20.

Hab. Bengal and Assam.

* I am not sure as to cirri forming any very valuable character of a natural genus. The length of the dorsal fin certainly does not; in the first species it is as long as in the Carp.

† P. G. These initials refer to Buchanan's work on Gangetic Fishes.

‡ This fish attains a large size in Assam, and is probably the true *Ruee* of the natives. That which is figured by Buchanan is as far as I have seen a small fish, though the larger kind which I have figured would seem to be the one he has described. This as well as the preceding species present so many varieties, probably the result of artificial means resorted to for their propagation, from their value as an article of food, that it is difficult to define their true characters.

Spec C. gonius, Buch. P. G. t 4. f. 82.

Scales minute; snout muscular and perforated by numerous mucous pores. D.15 : P.17 : V.9 : A.7 : C.19.

HAB. Bengal and Assam.

Spec. C. nancar, Buch. P. G. p. 299.

Sub-operculum rudimentary, and concealed beneath the integuments D.20 : P.18 : V.9 : A.8 : C.19.

HAB. North-eastern parts of Bengal.

"The following three species have a black spot at the base of the caudal, and the dark colour of the back descends in fasciated points on the sides, thus indicating a relation with the *Sarcoborinæ;* but until the nature of this relation be determined, and their habits and structure known, I place them with the Cirrhins. I only know them by Buchanan's figures and descriptions.*

Spec. Cyp. morula, Buch. P. G. Pl. xviii, f. 91.

Length of the head equal to the altitude of the body, and to a fourth of the length; lips pendulous, the hinder fimbriated. D.13: P.16: V.9: A.8: C.19.

HAB. Ponds in Bengal.

Spec. Cyp. joalius, Buch. t. 42, f. 6. β†

Head large and very blunt, mouth low and horizontal. D.12: P.—? V.9: A.8: C.—?

HAB. North-eastern parts of Bengal.

Spec. Cyp. dero, Buch. P. G. t. xxii. f. 78.

Only two cirri. Head oval and blunt, snout prominent and rough, lips smooth-edged. D.13: P.18:—? V.9: A.7: C.19.

HAB. Bramaputra.

"SUB-GEN.—LABEO.

"CHAR. Structure and habits agree with those of the Cirrhins, but cirri are wanting, or very minute.

"OBS. The last species would seem to be a *Catastomus*, and the two first to be very nearly allied to each other, and to differ chiefly from *C. gonius*, Buch. in being without cirri. They correspond with the species named by Buchanan, *Cyp. curchius*, *C. cursa*, and *C. cursis*, but I cannot altogether reconcile them with his descriptions; they appear to me to be varieties resulting from domestication.

* To these may be added for the present *Cyp. pausio*, Buch. P. G. 317. t. 42 f. 4 β. It seems to differ from them merely in being without cirri.

† This sign β, denotes that the figure given is from Buchanan's collection.

Spec. Cyp. curchius, Buch. t. 40. f. 3.

Scales minute and disposed so as to indicate longitudinal stripes, lips fleshy and fimbriated, seventy-eight scales along the lateral line, and thirty from the base of the ventrals to the dorsum. D.17 : P.16 : V.9 : A.7 : C. $\frac{10}{9}$.

Hab. Bengal and Assam.

Spec. Cyp. cursis,* Buch. t. 38. f. 3.

Snout thick and projecting, eighty-three scales on the lateral line, and about twenty-seven across the body from the base of the ventrals to the dorsum. D.16 : P.17 : V.9 : A.7 : C. $\frac{10}{9}$.

Hab. Assam and Bengal.

Variet. Cyp. cursa, Buch. t. 38. f. 2. β

Scales and fin rays the same as in *C. curchius*, but the back is more abruptly arched, and the abdominal margin is straight to the anal.

Spec. C. dyocheilus,† J. M. t. 37. f. 1.

Goreah of the Assamese.

Head long, opercular plates covered with thick integuments, snout muscular, forty-four scales along the lateral line, and thirteen in an oblique line from the base of the ventrals to the dorsum. D.12 : P.18 : V.9 : A.8 : C.19.

Hab. Assam, where it usually attains two feet and upwards in length.

"II. Gen.—BARBUS.

"Char. Lower jaw composed of two lengthened limbs, united in front so as to form a smooth narrow apex. Dorsal short preceded by a strong spine, lips hard, four cirri, intermaxillaries protractile.

"Obs. Species of this genus inhabit the Caspian Sea, the Nile, and several of the rivers of Europe, generally confined to clear water. The comparative shortness of the intestinal canal proves them to be less exclusively herbivorous than any other fishes of the same sub-family. The Indian species, indicated in the Regné Animal, all belong to other genera.

Spec. B. hexastichus,‡ J. M. t. 39. f. 2.

Cyp. tor, Buch. P. G. 305.

Lobura of the Assamese.

Length of the head to that of the body as two to seven, twenty-five scales along the lateral line, and six in an oblique row from the base of the ventrals to the dorsum. D.11 : P.17 : V.9 : A.8 : C.19.

Hab. Great rivers in the plains of India. Ordinary length from one and a half to three feet.

* This variety had been figured from a dried specimen and transferred to stone, before I found in Buchanan's collection a most excellent drawing of it.

† So called from the pendulous structure of the snout descending so as to form the appearance of a second lip.

‡ From the scales forming six rows along the sides.

*Spec. B. progeneius,** J. M. t. 56. f. 3.

Cyp. tor, Buch. Coll.

Length of the head to that of the body as one to three, twenty-six scales along the lateral line, and six in an oblique row from the base of the ventrals to the dorsum, with a large cellular appendage to the apex of the lower jaw. D.12 : P.16 : V.9 : A.7 : C.19.

HAB. Great rivers in the plains of India. Ordinary length from 1½ to 3 feet.

Spec. B. macrocephalus, J. M. t. 55. f. 2.

Bura hetea of the Assamese.

Length of the head to that of the body as two to five, twenty-seven scales along the lateral line, and six in an oblique line from the base of the ventrals to the dorsum. D.11 : P.16 : V.10 : A.7 : C.19.

HAB. Rapids in Upper Assam. Ordinary length from 2 to 3½ feet.

Spec. B. hexagonolepis,† t. 41. f. 3.

Bokar of the Assamese.

Length of the head to that of the body as one to four, exposed surface of the scales hexagonal, twenty-seven scales along the lateral line, and seven in an oblique line from the base of the ventrals to the dorsum. D.12 : P.16 : V.9 : A.7 : C.$\frac{10}{9}$.

HAB. Upper Assam. Ordinary length from 1½ to 2½ feet.

Variet. Cyp. putitora, Buch.

Head small and blunt, with eleven rays in the dorsal, attaining occasionally nine feet in length.‡

Spec. B. megalepis,§ Hardw. Illust. t. 93.

Cyp. mosal, Buch.

Mahaseer of the Hindus.

Body below uniformly arched at the insertion of the anal, length of the head to that of the body as one to three. D.13 : P.17 : V.9 : A.7 : C.$\frac{10}{9}$.

HAB. Northern parts of Bengal. Length occasionally four or five feet.

Spec. B. chelynoides, J. M. t. 57. f. 5. Jour. A. S. vii. t. 56. f. 5.

Head large, lips thick and smooth, thirty-three scales along the lateral line, and nine in an oblique line from the base of the ventrals to the dorsum. D.10 : P.16 : V.9 : A.7 : C.18.

HAB. Mountain streams at Simla. Usual size about six inches in length. Dr. Macleod's Coll.

* From Προγενειος, that has a prominent chin or long beard; in allusion to the singular appendage to the lower jaw of this species by which it may be easily recognized.

† In allusion to the form of the exposed portion of the scales.

‡ This fish I have been unable to identify with Buchanan's description, I may therefore have described it under another name; he says the head is blunt, oval, small, and smooth, which scarcely applies to either of the foregoing, in which the head is remarkably lengthened; that of *B. hexagonolepis* would come nearest to it, though some of the others seem to correspond more in other respects with the account given. Pisc. Gang. 303.

§ From *Mega* large, and *lepis* a scale.

"Obs. The following five species have the dorsal spine serrated behind. The first three are probably varieties of the same species.

Spec. Cyp. sarana. Buch. P. G. p. 307.
Cyp. kanta, id Coll.
Cyp. kunamo Russ?

Head blunt, oval, and small, with a small bone at either side of the upper lip, green above, below silvery, scales large. D.10 : P.16 : V.9 : A.8 : C.19.

Hab. Ponds and rivers in India. Rarely attaining two feet in length.

*Spec. B. spilopholus,** J. M. t. 39. f. 4.

Head much compressed, cheeks and snout perforated with mucous pores, forty-eight scales along the lateral line, and seventeen in an oblique row from the base of the ventrals to the dorsum; each scale marked with a black spot at the base. D.11 : P.15 : V.9 : A.7 : C.$\frac{10}{9}$.

Hab. Northern parts of Bengal.

Variet. Cyp. chagunio, Buch. P. G.

Scales large and spotted at the base, head much compressed, with numerous prominent mucous pores on its fore part. D.12 : P.15 : V.10 : A.8 : C.19.

Hab. Northern parts of Bengal.

Spec. B. diliciosus, J. M. t. 39. f. 3.

Head short and blunt, thirty-four scales along the lateral line, eleven in an oblique line from the base of the ventrals to the dorsum, with a bright gold coloured spot on each operculum. D.12 : P.16 : V.9 : A.7 : C.19.

Hab. Assam. Ordinary size about 10 inches in length.

Spec. B. rododactylus,† J. M.

Fins red and orange, except the dorsal and upper lobe of the caudal, ten rays in the dorsal.

Hab. Lower Assam. Usual size about 5 inches in length.

"Sub-Gen.—OREINUS,‡ J. M.—Mountain Barbels.

"Char. Head fleshy, mouth vertical, lower jaw shorter than the upper, snout muscular and projecting, furnished with cirri, dorsal preceded by a serrated spinous ray, scales small.

"Obs. Intestinal canal and stomach form a tube equal to about four or five lengths of the body, including the head and caudal.

* From *spilos* a spot, and *pholis* a scale.

† *Rododaktylos,* literally rosy-fingered, in allusion to its red fins.

‡ From *Oreinos,* pertaining to mountains. This genus has been since published by M. Von Heckel a German naturalist, from the collections taken home to Europe by Baron Hugel on which Mr. M'Clelland observes page 455 "that it would really seem as if we intended to leave all that requires either intellect or observation to discover in the productions of India to our neighbours on the continent, &c. &c. To be fairly rivalled in any pursuits where facilities are equal between the parties would be bad enough, but to be indebted to strangers for a knowledge of the productions of our own country argues a fault somewhere, but where that fault lies it might be a delicate question to enquire, as none of us I fear, would be altogether free from a share of the reproach."

Spec. O. guttatus, J. M. t. 39. f. 1.

Head covered with thick integuments, branchial apertures small, sides and fins irregularly marked with brown spots, scales minute. D.10: P. 17: V.11: A.10: C.20.

HAB. Mountain streams in Boutan, at an elevation of about 5000 feet, where it was found by Mr. Griffith.

Spec. Cyprinus Richardsonii, Gray. Hardw. Illust. t. 94. f. 2.

About eleven rays in the dorsal, and nine in the anal, back speckled with minute dots.*

Spec. O. maculatus. J. M. t. 57. f. 6. Journ. A. S. vii. t. 56. f. 6.

Mouth situated on the lower surface of the head, small shapeless spots irregularly distributed over the body, but not on the fins, scales minute. D.11: P.18: V.10: A.5: C.19.

HAB. Mountain streams at Simla, elevated between 5000 and 6000 feet, where it was found by Dr. Macleod.

Spec. O. progastus,† J. M. t. 40. f. 4. *Adoee* of the Assamese.

Muzzle fleshy and pointed, lips thick, somewhat pendulous and muscular, abdomen very prominent beneath the pectorals. D.12: P.13: V. 10: A.7: C.19.

HAB. Rapids in Upper Assam, where it occasionally attains 18 inches in length, but its flesh is believed to produce vertigo and other alarming effects on those who use it.

"III. GEN.—CYPRINUS PROPRIUS.

"CHAR. Body elevated, lower jaw short and rounded in front, lips hard, thick, and without cirri; dorsal long. Dorsal and anal usually preceded by spinous rays.

"OBS. Only two species of this group have been as yet found in India, and one of these is without the dorsal and anal spinous rays.‡

Spec. C. semiplotus, J. M. t. 37. f. 2. *Sentooree* of the Assamese.

Head slightly depressed, with a single row of large mucous pores extending horizontally in front of the snout, back gibbous, thirty-two scales along the lateral line, and ten in an oblique row from the base of the ventrals to the dorsum. D.27: P.16: V.9: A.9: C.19.

HAB. The rapids of the Bramaputra in Upper Assam. Usual size 1 foot to 1½ in length.

* This may probably prove to be *O. guttatus*.

† Προγαστως, that has a prominent belly.

‡ They have little affinity to each other; in *C. semiplotus*, the head is small and fleshy, so as to conceal the opercular plates, and in *C. catla*, it is large with naked opercula.

Spec. C. catla, Buch. P. G. t. xiii. f. 81.

Head large, forty-four scales along the lateral line, and fourteen in an oblique row from the base of the ventrals to the dorsum. Dorsal and anal without spinous rays. D.18: P.18: V.9: A.8: C.19.

Hab. Fresh-water rivers and ponds in Bengal and Assam. Ordinary size from 1½ to 3 feet in length, but occasionally it is found twice that size.

"IV. Gen.—GOBIO.

"Char. The dorsal is placed over the ventrals, and like the anal is short and without spines, lower jaw shorter than the upper, and is either round or square in front, lips thin and hard, snout prominent.

"Obs. The Gudgeons thus defined are a very natural group, remarkable for the extraordinary length of the abdominal canal. One of the only two indicated by Cuvier from Buchanan's species, is an Opsarion, a genus no less remarkable for the shortness of the abdominal canal than the Gudgeons are for its length; but as the distinctions on which the subdivisions of the family are here made, have not before been observed, we cannot be surprised, that it should be repeated in the last edition of the Regné Animal from Linnæus, that the stomach of *Cyprinidæ* " is continuous with a short intestine." The following five species have each two cirri.

Spec. Cyp. mrigala, Buch. t. 38. f. 1. P. G. t. 6. f. 7.

Length of the head to that of the body as one to four and a half, depth of the body about one-fourth of the length, forty-four scales along the lateral line, and fourteen in an oblique line from the base of the ventrals to the dorsum. D.16: P.17: V.9: A.8: C.19.

Hab. Rivers and ponds throughout Bengal and Assam. Ordinary length two feet.

Variet. Rewah of the Natives, t. 58. f. 1.

Head less compressed than the body, upper jaw somewhat prominent, forty-three scales on the lateral line and thirteen in an oblique line from the base of the ventrals to the dorsum. D.15: P.16: V.9: A.8: C.19.

Hab. Ponds in the vicinity of Calcutta. Length from 6 to 12 inches.

Spec. Cyp. curmuca, Buch. Jour. Mys. III. t. 30.

Snout prominent and furnished with tubercles or mucous pores, lips smooth, and on each there is a small bone. D.11: P.16: V.9: A.8: C.18.

Hab. Rivers in Southern India, where it occasionally reaches three feet in length.

Spec. Cyp. reba, Buch. P. G. p. 280.

Head blunt, mouth small and directed downwards, lips soft. D.11: P.17: V.9: A.8: C.19.

Hab. Northern parts of Bengal and Behar, where it attains two feet in length.

Spec. Cyp. acra, Buch. P. G. p. 284.
Cyp. angra, id. Coll.
Cyp. Hamiltonii, Gray, Hardw. Illust. t. 86. f. 1.
Lasseem of the Assamese.

Snout prominent and fleshy, thirty-five scales along the lateral line, and fourteen in an oblique line from the base of the ventrals to the dorsum. D.10 : P.10 : V.9 : A.8 : C.19.*

HAB. Bramaputra.

Spec. G. lissorhynchus.† J. M. t. 55. f. 5.

Snout smooth and blunt without cirri, thirty-nine scales along the lateral line, and thirteen from the base of the ventrals to the dorsum. D.11 : P.16 : V.9 : A.8 : C.19.

HAB. Large Rivers of Bengal and Assam. Usual length 6 to 9 inches.

"In the six following species the scales are thin and rough, and generally placed so that each scale is in the axis of the one immediately preceding or succeeding, and not in regular oblique rows as is usual in the family; but this peculiarity is not so well marked in some species as in others. They are all without cirri.

Spec. Cyp. bangon, Buch. Coll. t. 58 f. 2.β
Cyp. cura, id. P. G. p. 384.

Snout smooth without cirri, scales in parallel rows with a grey line between each row. D.12 : P.15 : V.9. : A.7 : C.$\frac{10}{9}$.

HAB. Bengal, where it attains a size of eight or ten inches.

Spec. Cyp. boga, Buch. P. G. t. 28. f. 80.

Snout perforated with numerous mucous pores, lower lip fimbriated, scales raised on either side of the base of the dorsal, lobes of the caudal slightly divided. D.12 : P.—V.9 : A.8 : C.—

HAB. Bramaputra. Usual length about nine inches.

Spec. G. bicolor, J. M. t. 40. f. 1.

Snout smooth, long, and rather pointed, lower jaw shorter than the upper, forty-two scales on the lateral line, thirteen in an oblique row from the base of the ventrals to the dorsum. Blue above, beneath silvery, pectorals small. D.12 : P.16 : V.9 : A.7 : C.19.

HAB. Rivers on the northern side of Assam. Griff. Coll.

Spec. G. anisurus,‡ J. M. t. 40. f. 2.

Snout blunt, lower jaw shorter than the upper, lips hard and smooth, thirty-nine scales along the lateral line, and thirteen in an oblique row from the base of the ventrals to the dorsum, lower lobe of the caudal longer than the upper. D.12 : P.17 : V.9 : A.7 : C.$\frac{9}{10}$.

HAB. Upper Assam. Griff. Coll.

* Buchanan gives the fin rays as D.11 : P.18 or 19 : V.9 : A.8 : C.19.
† From *lissor* smooth, and *rhynchus* the snout.
‡ From *anisos* unequal, and *oura* a tail.

Variet. Cyp. bata, Buch. P. G. p. 383.

Upper lobe of the caudal longer than the lower, with an ill defined transverse bar, ventrals smaller than the pectorals. D.12: P.17: V.9: A.8: C.19.

Hab. Rivers and ponds in Bengal, where it attains a foot in length.

Spec. G. limnophilus,* J. M. t. 55. f. 3.

Scales in parallel rows, thirty-six in each row, and twelve across the body. D.10: P.19: V.9: A.7: C.19.

Hab. Ponds in Bengal. Length 12½ inches.

"In the remaining species the scales are as usual in oblique rows.

Spec. Cyp. pangusia, Buch. t. 42. f.1. β†

Snout fleshy, porous, and prominent, forty-one scales along the lateral line, and fifteen across the body; lips fimbriated. D.14: P.18: V.9: A.7: C.19.

Hab. Bengal, where it attains a span in length.

Spec. Cyp. ariza, Buch. Jour. Mys. III. t. 31.

Snout and under lip smooth, twelve rays in the dorsal; in other respects it resembles the last.

Spec. G. ricnorhynchus, J. M. t. 55. f. 1.

Snout thick and wrinkled, forty-three scales along the lateral line, and ten across the body from the base of the ventrals to the dorsum. D.12: P.17. V.9: A.7: C.19.

Hab. Northern parts of Bengal, here it was found by Mr. Hodgson.

Spec G. malacostomus,‡ J. M.

C. falcata, Gray Hardw. Illust. t.—?§

Nepura of the Assamese.

Snout thick, fleshy, and perforated with numerous large mucous pores, margins of the lips double and fimbriated. D.12: P.16: V.9: A.8: C.19.

Hab. Rapids in Upper Assam. Length from six to twelve inches. Mr. Griffith's Coll.

"V. Gen.—GONORHYNCHUS.

"Char. Mouth situated under the head, which is long and covered with thick integuments, body long and sub-cylindrical, snout perforated by numerous mucous pores, dorsal and anal short, opposite, and without spines. The intestine and stomach form a continuous tube about eight lengths of the body.

* From Λιμνη a swamp or lake, and φιλος to love or frequent.

† Its form is not so slender as represented in the figure. Buchanan also gives seventeen rays to each pectoral, and eight to the anal.

‡ From μαλακος soft, and στομα the mouth.

§ This plate is not numbered in Hardwicke's Illustrations, nor is it included in the list of plates prefixed to the volume.

"OBS. This genus hitherto rested on a single species long since found at the Cape of Good Hope, but the *Garræ* of Buchanan chiefly belong to it, as well as several species which have since been found in India.

"The first three species are without cirri.

Spec *G. gobioides*, J. M. t. 43. f. 1. *Herilwa* of the Assamese.

Altitude of the body to its length as one to four, thirty-seven scales along the lateral line, and nine in an oblique row from the base of the ventrals to the dorsum. D.10: P.15: V.9: A.7: C.19.

HAB. Bramaputra, in Assam. Length about a span.

Spec. *G. petrophilus*, J. M. Jour. Asiat. Soc. iv. t. 1.

Scales very minute, body and head long, eight rays in the dorsal.*

Spec. *G. rupicolus*, J. M. t. 43. f. 4, 5.

Snout thick and smooth, pectorals rounded;† fins short, and the membrane in which their rays are enclosed thick and opaque; thirty-five scales along the lateral line, and nine in an oblique row across the body. D.8: P.10: V.9: A.6: C.20.

HAB. Mishmee mountains. Length about two inches. Griffith's Coll.

Spec. *G. bimaculatus*, J. M.

Snout warty, porous, and divided by a fissure, without cirri; a black spot at the base of the caudal, lower lobe of the caudal longer than the upper, thirty-four scales along the lateral line and eight rows between the ventrals, and dorsum; pectorals and ventrals lanceolate. D.9: P.13: V.9: A.7: C. $\frac{9}{10}$.

HAB. River Laeeh at the foot of the Mishmee mountains, where it was found by Mr. Griffith.‡

Spec. *Cyp. lamta*, Buch. t. 43. f. 2. β P. G. p. 343.
Cyp. godiyava, id. Coll.

Four very short cirri, pectorals and ventrals lanceolate, and a black spot on either side of the tail, snout thick and warty. D.10: P.13: V.9: A.7: C.19.

HAB. Northern parts of Bengal, where it attains 2½ or three inches in length.

Spec. *G. gotyla*, Gray, Hardw. Illust. t. 88. f. 3.

Snout thick, and divided by a deep transverse fissure in which numerous large mucous pores are situated, a fleshy pendulous point at each corner of the mouth; four minute cirri.

HAB. Mountains of India.

* The habits of this species are fully described, but we want to know more of its specific characters.

† The form of the pectorals is not accurately represented in the figure.

‡ Also at the foot of the Nipal mountains, where Mr. Hodgson appears to have found a specimen now in the Asiatic Society's collection. In this, however, the lobes of the caudal are of equal length. It is so like the succeeding variety that I have thought it unnecessary to figure it separately.

Spec. G. fimbriatus, t. 43. f. 3. β
Cyp. sada, Buch. P. G.
Four cirri little shorter than the head, pectorals and ventrals falcate.
D.10: P.—? V.9: A.7.
Hab. Northern parts of Bengal, where it attains a few inches in length.

"The remaining three have each two small cirri.

Spec. G. macrosomus,* t. 43. f. 7. β
Cyp. latius, Buch P. G. p. 346.
Depth of the body to the entire as one to six, two cirri, scales small,
D.11: P.13: V 9: A. 7: C.20.
Hab. Northern parts of Bengal.

Spec. Cyp. gohama, Buch. P. G. p. 346. t. 43. f. 6. β
Cyp. dyangra. id. Coll.
Is shorter in proportion, and more arched above and below than the former, and has eight rays in the anal.
Hab. Northern parts of Bengal.

Spec. G. brachypterus, J. M.
Lower surface of the head flat with a cartilaginous zone behind the mouth like *G. rupiculus*,† a few irregular pores on the snout, thirty-six scales on the lateral line and seven rows across the body.
Hab. Mishmee mountains. Griff. Coll."

[A coloured drawing of each species is given, together with a detailed account of whatever is known regarding it.]

Art. IV.—*Account of a Journey from Sumbulpúr to Mednipúr, through the Forests of Orissa.* By Lieut. M. Kittoe.

(Concluded from page 606.)

I marched from Mednipúr about the middle of December of the past year, and proceeded by the regular dawk stages as far as Doodkhùndí a small village beyond Ghooteah, distant thirty-six miles. From this place I left the road and proceeded to Gopíbullubpùr, a town on the right bank of the Subunreeka river and about eight miles due south.

On first leaving Mednipúr the Cossai river is crossed (forded) and the high iron-stone formation (at the extremity of which the town stands) is quitted. The road (if it deserves such a name) passes over low land as far as the second dawk station called Chardeh, a little beyond this the iron-stone is again met with, and forms the southern limit of the level valley of the Cossai, which is throughout highly cultivated

* From Μακρος long, σωμα the body.

† It also agrees with that species in the form of its fins; the presence of two very minute cirri being my chief reason for separating them, I have not thought it necessary to give a figure.

and thickly populated; the chief cultivation appears to be rice, there is however some indigo, also sugar-cane.

From Chardeh to Ektale (the 5th stage) there is but very little clear and cultivated land, consequently much jungle; a little cultivation occurs near Bajennah (the 3rd stage) also near Purooliah (the 4th). The soil is much the same as that of Mednipúr, perhaps a little more sandy. Although there is so much dense jungle, there are evidences of the land having once been cultivated, and were it cleared I should think that the soil would prove rich and well adapted to the growth of cotton.

Ektale is a large village on the edge of the high iron-stone formation, here bordering what may be termed the valley of the Dolung river, and (like that of the Cossai) fertile and well cultivated. There are several large villages right and left of the road towards Ghooteah, which is on the high land to the opposite side of the valley, distant four miles from Ektale.

Messrs. MacDonald have an indigo factory near Ghooteah and much plant is grown on the high grounds in its vicinity.

There appears to be much low jungle to the northward of the road, and a considerable belt to the southward also, beyond this towards the valley of the Subunreeka in the Dholbhoom and Maunbhoom districts (commencing near Ghooteah) the country is open and well cultivated, I remarked some very fine gram and mustard, and should think that superior wheat, barley, and flax might be grown throughout this tract, likewise sugar-cane. The scenery is very beautiful, particularly towards the southern and western horizon, the Semulpal, Kussum, and Baumunghatti hills in Mohurbhunj add greatly to the beauty of the landscape, and when the broad bed of the Subunreeka is full in the rains, it must also contribute no small share of elegance to the picture.

I halted a couple of days near Gopíbullubpúr, which is a very large village belonging to a Gosain; a little to the northward are several other villages close together, the principal of which is Nyabussaun, it gives name to a large purgunnah belonging to Mohurbhunj. The Raja has given it on a long lease to Messrs. MacIntosh, indigo planters, who have several factories on the Maunbhoom side of the river, one of which is opposite to Gopíbullubpúr; their bungalow was burnt down the night previous to my arrival. The Mohurbhunj people appear dissatisfied with the arrangements above alluded to, they seem to be averse to the cultivation of indigo, thinking that it impoverishes the land.

I wished to have advanced to the hills where the pass over which the dawk travels, is situated, but so determined were the people to prevent me, that I was obliged to alter my course. I did not lose much by it as I was enabled to survey the country along the right bank of the river and its vicinity, which had never yet been done. This portion of the Subunreeka valley is very fertile, but, of no great extent inland ; undulating ground, and beds of shingle, covered with dense jungle occur, forming a belt that divides it, from the valley of the Boorabalung river, which rising in the Semulpal hills, winds under those of Kussum and Bunkatí, then flowing in a southerly direction towards the Nílgur hills under Balasore, finally empties itself into the sea near Bullramgurhí.

There is little or no fine timber on the belt of high land above alluded to ; I passed over it in two marches, and entered the Boorabalung valley, then continued in a north-westerly direction to Bunkatí, the principal village of the purgunnah of Ooperbaugh. I crossed the Boorabalung which is a very clear, rapid stream, about kneedeep, with very steep banks ; its course is here very tortuous, there are many rapids ; I re-crossed it before reaching Bunkatí near to which place, I halted a couple of days. There are falls over some talcose rocks about a mile below the village, the spot is held sacred. The water does not fall from any great height, but the strange appearance of the rocks and the wooded banks of the stream, which above the falls is still and deep, render the scene very beautiful. The singular appearance of the rocks (talcose) is occasioned by the strata being vertical or nearly so, they lean against a totally different formation, which appears to be basalt in different stages of decomposition.

I here observed a very simple, though ingenious, way of entrapping fish. In one part of the falls, in a narrow space between two rocks, there is a long slanting thatch fastened, from the lower end of which is a fine basket work frame, slanting at a wider angle than the former, and above it ; the fish in attempting to leap, fall on to the thatch and slip down to the lower part of it, from whence they cannot escape. The crafty Brahmuns impose on the people by telling them that the presiding "Thacoor" or deity has the power thus to cause the fish to sacrifice themselves to him or her. The Brahmuns remove the fish early in the morning, and cook them in their "Bhog mundup" temple cook-house ; the first dish is placed as an offering before the idol, for the consecration of the whole, which is eaten by the attendant priests, or distributed to their friends.

The village of Bunkatí is nearly deserted, as well as most others in

this fine purgunnah; the farmers are of the Bhoomia cast; they have been obliged to forsake the lands on account of the serious extortions and acts of injustice inflicted on them by their dissipated and ignorant chief, the Raja of Mohurbhunj. It is much to be regretted that our Government has not the right to exercise more extensive control over the tributary mehauls in general, particularly over this of Mohurbhunj, in which there is so much fine land, that could be brought to favorable account. The ryots cultivate little more than what is sufficient to answer their immediate wants, knowing too well that the production and possession of more, would only afford further grounds and opportunities for their being plundered of all, it is hence that on the occurrence of a bad harvest the poorer people perish from starvation, and its accompaniment, pestilence. I have been told that more than half of the population of all the jungle mehauls has been swept away within the last three or four years from these causes; judging from the scanty population, and the number of deserted huts to be seen in every village, wherever I have travelled, I am inclined to think that there is little exaggeration in the assertion.

It is scarcely necessary for me to add that it would be hazardous for Europeans to take tracts of country, (were the chiefs to give the lease of them) unless the government would protect their rights. There is an Indigo factory at Jáldá near Seersa in the Oopurbaugh purgunnah; but as an instance of the uncertainty of procuring labourers, this factory was nearly at a stand still, during the present season, in consequence of the causes above alluded to, (viz. the desertion of the ryots.)

Whilst touching on the subject of Europeans farming in these mehauls, I must add that although the population is at present so scanty and at all times its number uncertain, I feel confident that were purgunnahs taken on long leases with the guarantee of protection on the part of our government there would be (under proper and equitable management on that of the European farmers) no want of ryots of all classes, Boomiahs or Sontauls, and even Dangurs from the northward, who would flock to them for employment; the wants of these people are few, consequently labour is, and would be, very cheap. The Boomiahs are a powerful and industrious race of people, they are the principal landholders in these parts. The Sontauls are an inferior class, but a cheerful race and make very good labourers; I have frequently seen eight or ten employed on the road, cheerfully dragging timber carts, with one or two of them playing on a kind of flute, made of the joint of a bamboo, as an accompaniment to the songs of the rest of the party.

There are a few *guallas* located here and there, they generally clan together and have villages to themselves. It would be of great service if some colonies of these useful people (who are usually bearers) were induced to come from the Mogulbundí* near Buddruc and Cuttack, and to establish themselves in different parts of the road, the only obstacle to dawk travelling would then be removed. I should here observe that the only sure means of establishing a good thoroughfare for both merchants and the dawk, would be for government to purchase the land on each side of the road, to the extent of half a mile each way or more, and then to allot it to the dawk runners and bearers, as well as to other persons requiring it; in a very few years every available beegah of ground would be eagerly taken, cleared and cultivated; for the first five years nothing but a nominal rent should be exacted, and ultimately it could be assessed at a low rate. The purchase would not amount to much, and some of the tracts I should think would be readily rented by Europeans, to wit the Bissai valley, which I shall presently describe.

From Bunkatí I proceeded due north for two short marches, when I reached the foot of the pass called "Nittai Maungur," or the "Thacooraní" ghat, from the high hill of that name, which commands it; this hill (as the name implies) is looked upon as a form of the goddess of destruction; all very prominent mountain peaks, caverns and natural curiosities in general, are deified by the benighted inhabitants of the jungles.

In the evening, I ascended the ghat, it is very rugged and steep, we lighted numerous bonfires to scare the wild beasts, and encamped for the night, in the middle of the road, the only level and clear ground we could find; the following morning we marched to Bissai, passing the Kurrumbilla dawk stage, about midway; it was here and on this occasion where I observed a break in the hills to the northward of the pass, that led to the discovery of a defile by which this valley can be entered with a scarcely perceptible ascent, I further discovered that a fine road existed, by which many years ago merchants used to travel, it is now blocked up with fallen trees, and overgrown with high grass, there are several tanks and many mango topes, one of the former is called the Brinjarah's tank. Judging from the vast number of large *peepul* and *banyan* trees of great size and age that occur by the road side, together with what information I was able to collect, I think that the road must be of great antiquity, and no doubt much frequent-

* The Mogulbundí includes most of the Purgunnahs in the plains which are under our regulations.

ed, the sites of many villages still appear. The people say that some of the former rebel zemindars of Baumunghattí blocked up this road, to compel the merchants to travel by the lower valley and through the town of that name; whatever truth there may be in this, it is equally probable that the thoroughfare was closed to keep out the Marhatta plunderers towards the end of the last century. I have traced this high road as far as the Byeturní and I have no doubt that it continued on to Sumbulpúr and thence to the western coast.

I halted for the day at the village of Bissai, this place, was together with every other in the valley, destroyed by the Coles in 1834-35, it has been partly rebuilt; before its destruction it extended for near a mile in length, but like most towns in Orissa, it had no depth. I continued my march and survey up the valley by the regular dawk stages and halted for a day at Nowagaon, which place I have before mentioned. Many small villages had sprung up since my visit on my march from Sumbulpúr, but every one had suffered more or less from the herd of wild elephants, sixty in number, which infest this valley and the surrounding country; these beasts had thrown down the huts to obtain the small stores of grain, and had destroyed every description of cultivation from one end of the valley to the other. Many people had put bags of poisoned rice in their stores but the sagacious beasts were not to be caught. I was told that since a number were destroyed by a Gosain many years ago, by poison, not one has taken the bait.

Nowagaon is (as I have said before) within a couple of miles of the westernmost extremity of the valley; it has once been a large town and on the old road, the course of which is apparent from the rows of aged peepul, banyan, jaumun, mango, and other trees, there is a place near this village held sacred, it consists of the remains of a temple under a clump of enormous trees of various kinds; to the branches of one of them, are nailed numerous pieces of iron chains of various sizes, which must have been fixed there as offerings to the destructive deity, whom the poor inhabitants suppose to live in a cavern at the top of one of the high hills which tower above the valley on its north side, close to the village; they believe that at night, she comes from her retreat and with the chains fastens up her herd of tigresses for the purpose of milking them. They further relate that whenever the villagers neglect to make the usual offerings of milk, rice, and fowls, she becomes enraged and loosens some of her tigers, who never fail to carry off both men and cattle. The poor zemindar could not understand why I did not make some offering, I could not speak Ooreyah, therefore I was unable to explain the folly of such degrading superstition.

The Bissai valley is evidently a most fertile tract of country, it is about twenty miles or more in length, and averages on the whole about four in breadth; there are several small streams intersecting it, and one large torrent called "Korkaie" which rises in the Seemulpal mountains to the southward, and crossing the valley between Nowagaon and Arjunbilla, winds down its northern face, turns round the base of the Soolapát hill (one of the points in the trigonometrical survey) then passing through the Baumunghattí valley continuing in a north easterly direction, ultimately joins the Subunreeka somewhere near Ghatisila; the water of this rivulet could be made available for sugar mills.

Leaving Nowagaon I proceeded by a narrow defile towards Jushpurgurh, which place I reached in two marches. I passed the Tinderí ghat (which I have already described) to my right, and found myself in another extensive valley, bounded on one side by the Buddaum range, and on the other by the lofty Seemulpal and Selma mountains. The villages here (like those of Bissai) have all been destroyed, the country has become a perfect wilderness but in the immediate vicinity of Jushpur it is open and well inhabited, the cultivation is chiefly rice and oil seeds.

Jushpurgurh is the capital of a large purgunnah of that name, belonging to Mohurbhunj, it is situated at the confluence of the rivulets Krère and Bundun, on a high mound between the two; the place was in former years strongly stockaded, but at present there is scarcely a vestige of the works left. The town is built round the foot of the mound.

The two rivers assume the name of Krèrebundun below their junction, where, for the distance of a mile they flow in a deep and narrow channel as far as a spot called Ram Teerut; at this place the (gneiss?) rocks stretch across a little below the level of the banks, the Krèrebundun falls over them into a tolerably deep chasm, in which there is a large circular basin; beyond it is a smaller fall into a second pool from whence the river flows over a gravelly bed by a most tortuous course, till it finally empties itself into the Byeturní a little above Jotepúr. The water is considered very good, there are fish in abundance, a very fine Mahasír was caught and brought to me. The mode of fishing here is curious, a net is let down and placed in a circular manner, several persons ply about in canoes and keep tapping the rocks at the bottom with long poles to frighten the fish from under them, the two ends of the net are gradually closed, it is then drawn up and the fish taken out.

There are the remains of a small temple beside the falls, also several strange marks in the rock caused originally by the water: some are

in the shape of a man's foot, others of the hoof of a cow, all have been improved by human skill, and the priests assert that the former are the marks of Ram and Seeta's feet; and the latter those of "Nandì" the bull of Siva.

In examining the nature of the rock and of the shingle bed, I discovered beautiful specimens both of the common and of the precious green serpentine, the natives say it is washed from a small hill above Jushpúr, it is a most beautiful mineral and would make very elegant mantel-piece ornaments; I sent a man to bring me a large quantity, but he never returned.

From Jushpúr I marched through an interminable forest for four days, being misled by the roguery of the zemindar, and the obstinacy of my guard and other attendants. I passed the site of many large villages, and over vast tracts of grass, elephant-high, growing on land where once luxuriant crops had smiled, but all is now a wilderness.

The forest has no underwood, every inch of the land could be cultivated. I left this wilderness, at Sukroorí a large Sassun village near the high road, and which I have mentioned in a former page, it belongs to a junior branch of the Mohurbhunj family styled "Burkonwur," who hold the purgunnah of their kinsman the Mohurbhunj Raja.

We had the misfortune of being overtaken by rain (which set in on the 12th January,) the first march from Jushpúr. We had great difficulty in procuring supplies, and were much tormented by the chicanery of the Zemindars, who were evidently acting under the Raja's orders; the rain fell daily, not a dry spot could be found, consequently every person suffered more or less, sooner or later; we were more fortunate at Sukroorí where there was good ground and plenty of shelter. The natives of the country seemed to take it very coolly, they always construct bowers under shady trees in the centre of which they set fire to huge logs of dry or rotten wood, which are kept constantly burning; at night, all hands sleep in a circle round the fire with their feet towards it, few have any clothing beyond a small piece of cloth, which answers at once the purpose of a dhotí, a covering sheet, and a bag to tie up their store of rice. I am inclined to think that there is a virtue in the dense smoke which is kept up, that it dispels malaria.

We halted three days at Sukroorí, but the rain not clearing, I deemed it expedient to order a move and marched to Gobindpur, the place where I had encountered the fearful tornado on my march from Sumbulpúr, thinking it better for my followers at any rate, to have the advantage of the good water of the Byeturní, I was however mistaken, the incessant rain caused almost every person in camp to catch

jungle fever; for several days I had barely a servant to attend upon me, I was forced even to pitch my own tent, I soon followed the general example likewise my family, for our tents were saturated as well as the ground, which being soft caused the pole to sink into it; not a dry spot was to be found. I broke ground and moved to Phoolkonlaie, where the soil was better, but the fever was too much rooted in all, for the change to be of any benefit; after passing many days in this unhappy state, I resolved on retreating the best way we could to Mednipúr, which station we fortunately reached on the sixth day; this change restored us.

A few remarks on the climate of these tracts, and the apparent causes of sickness may be acceptable.

While at Phoolkonlaie stretched on my back with fever, I observed that the wind below was blowing in a different direction from what it was above, which latter was westerly with a clear sky, we were enveloped in clouds and mist, with variable wind from an easterly direction; this atmosphere, if I may so term it, appeared to extend to the height of the level of the mountain tops, viz. about 1600 feet. The tract of land extending between the Buddaum and Keunjur hills, a span of 50 miles, is considered very unhealthy by all, may it not then be attributed to the absence of free and variable currents which in other more open tracts dispel the earth's vapors and prevent an accumulation, which must be the real cause of sickness? as long as the ground is dry there is less danger, but a single heavy shower followed by cloudy weather causes the poisonous vapor to rise, and there is no escaping its evil effects.

I have here described one cause of fever, but there is another of an opposite nature, viz. the intense heat of the country in the months of May and June, after every particle of vegetation has been consumed by fire. From the description I have heard of this fever I should imagine it to be of the brain; the patient with little warning is seized with a shivering, violent head-ache, and vomiting, delirium quickly follows, and in three days death puts an end to his miseries; natives and Europeans suffer alike from this scourge, for a more particular account of it, I would beg to refer my readers to Mr. Motte's Journey to the Diamond mines, alluded to in a former page.

Before I take leave of my readers, I will offer a few remarks on the products of the forests; of these the tussur silk is the most common, and at the same time, most valuable. Lac is also to be found; the production of both in large quantities might be effected, particularly of the former.

The tussur worm is reared on the *assena* trees (Terminalia alata tomentosa) which are left standing wherever the jungle is cleared and their branches are kept lopped to a certain height, the more easily to allow of collecting the cocoons, great quantities of which are also found in the forests; they are mostly bartered to the merchants from the plains, but some are spun and wove into coarse pieces for the wealthier ryots and zemindars of the country.

The lac insect is said to abound in the Nursinghur district, north of Dholbhoom, it has lately been imported and propagated in that purgunnah. It thrives on the *peepul* "Ficus religiosa" also on the *kussum*.

Those people who collect lac and attend to its culture, have certain superstitious rules, which they strictly adhere to, thinking that the slightest neglect will displease the patron deity and cause failure. They believe that there are certain quarters of the moon, and certain days, on which the insects taken from the parent stock must be spread on the trees, the persons who perform this office abstain from food or drink, neither do they wash nor perform any of nature's functions, there are other minor rules which I cannot recall to memory.

Dhoona (the resin of the sâl tree) is collected in considerable quantities, and likewise bartered.

I believe that very few deer hides and horns are collected in these parts of Orissa, although there is no scarcity of ruminants of various species, amongst which are the formidable Gowrí Gaw (Bos gaurus.)

The forest abounds in fine timber, but unfortunately the largest and soundest trees are usually found in the most inaccessible glens. The *Tendoo* or bastard ebony grows to a great size and is very common; some trees produce very fine logs, and of any length, large quantities of this wood rough wrought in thin bars of from two to three feet in length, are exported to Mednipúr where they are sold to the turners and converted into rulers, walking clubs, and hooka pipes, and ultimately sent to Calcutta.

There are many kinds of wood which I have no doubt would answer well for furniture purposes, that of the nux-vomica in particular, as no insect will go near it, not even the white ant, it is hard with rather a fine grain and pretty colour; the tree grows to a great height and size.

A small quantity of "Kuth" (catechu) is prepared from the Krère "mimosa catechu" but not for exportation.

The *pullas* (Butea Fundosa) grow in the Keunjur jungles in greater numbers than in those of Mohurbhunj, and if there were a sale for the gum, no doubt the people would collect it.

There are many trees the seeds or nuts of which yield good oil, the *mohwa* or *mowl* (*Bassia latifolia*) in particular is very plentiful.

Having enumerated all the jungle products which came under my notice, I must now add that for Europeans to traffic in any, it would be advisable to establish a mart at Kumererha on the Subunreeka, a large village through which the road passes, it is in the Dholbhoom purgunnah belonging to the Raja of Ghatsilla, it is nearly opposite to Seersa in Mohurbhunj, where there has long been a weekly mart held on Tuesdays; this would soon give way to any new one established on the Dholbhoom side, as property is more secure. There is an indigo factory near the village, belonging to Messrs. Macdonald, the situation is far from unhealthy for there is no heavy jungle very near the place, it is under the influence of the sea breeze which blows up the valley of the river. The hot weather is also rendered less oppressive from the frequency of severe thunder storms, which are attracted by the adjacent hills, they are generally accompanied with showers of rain and hail. The country as I have before said, appears very fertile particularly the lands of Dholbhoom, very good sugar is produced, and I should think that the Mauritius cane would thrive on some of the gravelly jungle tracts, the soil of which remains moist a few inches below the surface. The white ants would be the greatest drawback. I must now conclude, trusting that ere long, British industry and capital will be profitably employed in the jungle mehauls to the benefit of the merchant and of the now unhappy ryots upon whom the light of civilization has not yet dawned.

M. K.

ART. V.—*Note on a pillar found in the Ganges near Pubna, and of another at Kurra near Allahabad.—By Lieut.* M. KITTOE.

The elegant pillar represented in the accompanying plate, Fig. 1. (together with three others) was found a few months back in a chur, (sand bank), in the Ganges near Pubna, and sent to the Asiatic Society, by Mr. Allen of the Civil Service. I requested that gentleman to give me any information he might be able to obtain, to enable me to judge, whether these elegant pieces of Hindú sculpture had been sunk there by accident, or whether they might not have formed part of some temple existing on the spot, previous to the River having taken its present course; the following is the reply he has favoured me with—

"It was found with three others exactly of a similar kind (one of which has been slightly injured), embedded in a chur on the Ganges

about four miles from this station (Pubna); the end of one of the pillars was visible on the sand bank, and all the four were dug up very close to one another, with them were found half a dozen stones, which were not sculptured, nor of any particular size; the latter seem to me to have been a part of the pavement or steps of the building."

Mr. Allen further states "on referring to Rennel's old Maps, I observe that at that time in the direction that the chur now is, there must have been a village at some distance from the river, traces of the ancient course of the Ganges are still visible about two miles and a half or more off."

On first examining the pillar it occurred to me that it had never been erected, as the capital is unfinished, and that in all probability it had been sunk by accident at a remote period, while being conveyed to some place lower down the river. I am now inclined to think that the whole may have belonged to some temple existing on the spot previous to the inroad of the river.

The pillar which is here represented is of a hard black stone, resembling basalt, but from the long action of the water and mud, its surface has become of a dirty white colour. Its height is seven feet in all, thirteen inches and a half at its base, (which is square) and ten inches and a half diameter at its summit which is circular; from the base to the second moulding, (three parts of its entire height) it has twelve sides; an exception to the more general rule, which requires the base to be square, the second division octagonal, the third of sixteen sides, and the fourth perfectly circular.

The style of architecture is that of the twelfth or thirteenth century. The workmanship is remarkably good, and the group of figures representing dancers and musicians though rather rudely proportioned, have much life in them. On one of the sides is a lizard, and on another a bee of which I cannot make out the meaning, unless they be merely as guide marks to the mason for facing them properly.

The circumstance of four only being found, confirms my opinion that they have supported the roof of the "Nandi Subha" or ante-room in which the "Nandi" (bull of Siva) is placed, and as the tops of the pillars are only rough hewn, it is probable that they supported a wooden roof such as are still common in the vicinity of Cuttack, where there are some of great antiquity and of most extravagant workmanship.

Fig. 2, represents the fragment of an elegant pillar at Kurra near Allahabad, which I drew several years ago, when encamped at that place. It is built into an old Mahomedan tomb of great antiquity, and

CENTRAL LIBRARY

Fig 2

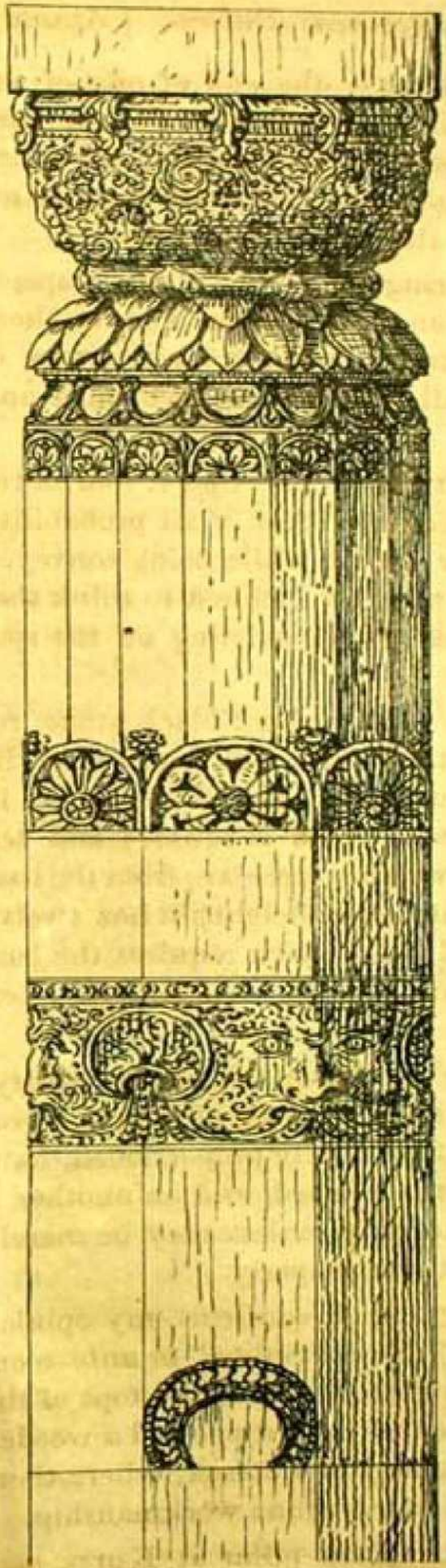


Fig 4



has evidently been taken from one of the temples destroyed during the first Mahomedan invasion.

The most remarkable features are the heads, and festoons (hanging from their mouths), which is one of many instances I have seen of Hindú ornaments, apparently of Grecian origin, which I shall remark upon more particularly at some future period. M. K.

ART. VI.—*Note by Messrs. Jessop & Co. of Calcutta, on the smelting of the Iron Ore of the district of Burdwan.*

To the Officiating Secretary Asiatic Society.

DEAR SIR,—The Iron Ore with which we made the experiment in smelting, was a portion of that obtained by the Coal and Iron Committee from the district of Burdwan. We smelted above half a ton of it, which yielded about 2 cwt. of Iron, or barely 20 per cent.; it would therefore be considered an Ore of little value by the Iron masters in Great Britain.

The operation was carried on exactly according to the practice of the large blast furnaces in England;—owing however to some peculiarity in the nature of the metal it could not be brought into a fluid state, but after its reduction from the Ore, lay in a mass at the bottom of the furnace.

We were not prepared for such a result, and as we had no means of extracting the metal, we were compelled to discontinue the experiment, when the *hearth* had become full, instead of carrying it on for a day or two, or until the whole of the Ore we had at our disposal was consumed.

We have no doubt that if we could have submitted the Iron, as it lay in the furnace to the process of *puddling*, it would have been converted into an excellent malleable Iron, similar to that made by the natives in various parts of India, by whom the metal is never brought into a fluid state.—It would be interesting to ascertain whether the same difficulty, viz. the non-fluidity of the metal, was not experienced at the Porto Novo works; we have some reason to think that it was the case.

We consider it very probable, however, that after repeated experiments, conducted by persons experienced in the business, a method of treating the Ore might be discovered, by which the Iron would be obtained in a fluid state, so as to be available for the purposes of a foundry.

We have the pleasure to send you samples of the Ore before and after *calcination*, also of the Iron produced, and of the Lime-stone used in the experiment.—The latter was procured by us from Sylhet and is of excellent quality.

We are, Sir, &c. &c.

20th Sept. 1839. JESSOP & CO.

P. S.—The following are the quantities of the materials expended ;—Ore 1220 lbs. Coke 1278 lbs. Lime-stone 744 lbs.—The experiment occupied about twenty-three hours.

ART. VII.—*Note on the habits of the Coel, and on the discovery of Isinglass.—By* MAJOR DAVIDSON.

To the Secretary to the Asiatic Society.

SIR,—Happening to stand in the veranda of my bungalow, a few days ago, I heard a loud chattering noise on the lawn ; believing that a young crow had fallen from its nest I advanced to put it out of the reach of harm. Instead of a crow I was much astonished to find that an old crow was feeding a young bird of a dark brown colour, transversely striped with cinereous bars. On asking its name of a native who also saw it, he replied that it was a young Coel. I approached it within a few yards and saw it receive food from the crow's bill, in the usual supplicating posture, with extended wings, and body slightly quivering. The native informed me that the Coel never made a nest, but always took possession of that of a crow, by whose incubation, its eggs were hatched ; and also, that the crow invariably continued to feed its adopted nestling, until it could shift for itself. From having seen this I can have no doubt of its truth. A few days ago the neighbouring mango topes, resounded with the plaintive notes of the Coel, but at present they are not to be heard from which I am inclined to believe, that like the Cuckoo it is a bird of passage. It is a curious coincidence that they should both rear their young by practising a similar imposition on other birds. Is this common to the genus ?

Observing in your 87th number that Mr. M'Clelland states, that "The very valuable production, *Isinglass*, has been recently found "to be yielded by one of the fishes of the Hoogly."

I beg to mention that on the 18th of June, 1820, while residing at Sooltanpoor, Oude, in a bungalow on the banks of the Goomty, I addressed a letter to that eminent naturalist the late Major General Hardwicke, acquainting him that I was in the habit of opening every

large fish of the genus Cyprinus that was brought for sale, and extracting the air bladder, from which I made Isinglass. While residing at Calpee, on the Jumna, in 1832, I made a quantity large enough to fill the drawer of a writing desk, from every large fish such as *Rohoo*, *Kutla*, *Muhaseer*, and various others which were brought for sale. The weights of the pods varied according to the size of the fish, (which was never above forty pounds) from half a drachm to half an ounce. I rejected the fibrous and soaked the gelatinous coat in strong limewater for five or six days, (in the *cold* weather) when it was ready for use as Isinglass, and equal to any for sale. I am of opinion that the article may be found in every fish that rises to breathe, whether whale, grampus, porpoise, shark, &c.; that the quantity will depend on the size of the fish, and the quality be found nearly similar in all.

I am Sir, &c. &c.
S. C. DAVIDSON.

Allahabad, 15*th Sept.*, 1839.

ART. VIII.—*Note on the Scapes of Xanthorhœa and Fossil Stems of Lepidodendra.—By Lieut.* N. VICARY.

To the Secretary to the Asiatic Society.

I have the pleasure to send you some remarks on the resemblance, existing between the stems of "*Xanthorhœa*;" a native of New South Wales, and the fossil stems of "*Lepidodendra.*" It is an object of such great interest to trace any affinity between fossils and existing species, that I make no apology for obtruding my rough note upon you, and asking you to publish it.

Xanthorhœa belongs to the tribe Asphodeleæ and is well known in N. S. Wales under the name of "Grass Tree," the naked flower scapes rise to ten or twelve feet in height, from the bosom of a tuft of grass like leaves, and are used by the Aborigines as shafts for their spears, for which they are well suited from their lightness and strength; there are seven species described, some of which do not form a distinct stem, and others form a stem often eight or ten feet in height, and occasionally branched in an irregular manner, not symmetrical as in Coniferæ, from which in the fossil state, that alone would be sufficient to distinguish them—they have no true bark, but as in Cycadeæ an outer coat formed by the bases of the fallen leaves, the coat is from one to two inches in thickness, rough outside, but becoming smoother on the older parts, exhibiting the bases of the leaves, arranged in quin-

cuncial order, their very bases become accreted within into a false bark of considerable strength—the outer coat is with difficulty separated from the fresh stem for the purpose of examination, but in the old and partly decayed stems, is easily detached and gives a clear view of the inner surface. I found some stems quite hollow, the woody core having decayed and disappeared, the cortical portion contains a large quantity of resin with the appearance and colour of Gamboge, which is perhaps the cause of its preservation, this resin is also found abundantly on the ground round the base of the plants, and I believe is for the most part exuded on those occasions when the grass is set fire to, a practice resorted to in N. S. Wales as in India, for the purpose of destroying the more rank kinds of vegetation—the inner surface of the false bark is densely covered with lozenge-shaped areolæ arranged in a quincuncial manner—the transverse diameter (with respect to the axis) is the longest—the woody core exhibits impressions of similar areolæ, a point rises in the middle of each, which is received in a corresponding hollow in the areola of the outer coat—it appears in fact as if the outer coat was a mould in which the wood was cast, the base next the crown of the root is thickest, rounded and blunt, the shaft is often irregular in thickness with a strangulated appearance, owing perhaps to those seasons in which the growth of the plant was retarded. I regret having neglected to examine a transverse section of the wood, and cannot recollect any thing peculiar about it unless its coarse and loose grain.

The above imperfect note exhibits several points that quadrate with the descriptions given of some Lepidodendra and I send it to you chiefly for the purpose of drawing the attention of those who feel an interest in such things to a further and more complete investigation of the subject. It was my intention to have brought some stems to Calcutta and to have followed up the inquiry with the assistance of some person more competent to the task, I however was unable to do so. It would be easy to procure them from Sydney, as there are many very large trees flourishing at about two miles to the South of it, small ones are to be had everywhere.—The resin mentioned above has been sent to England, and found to be useful to coach makers as a varnish.

I am Sir, &c. &c.

N. VICARY, *4th Regt. N. I.*

ART. IX.—*Proceedings of the Asiatic Society.*

(*Wednesday Evening, the 2nd October*, 1839.)

The Right Rev. the LORD BISHOP of Calcutta, Vice-President, in the chair.

The Proceedings of the last Meeting were read and confirmed.

Captain J. W. BIRCH was proposed by Dr. O'SHAUGHNESSY, seconded by the chairman.

Mr. E. K. HUME was proposed by Mr. STOCQUELER, seconded by the officiating Secretary.

Read a letter from the Secretary of the Royal Institution of Great Britain, acknowledging the receipt of copies of the Journal of the Asiatic Society.

Read a letter from Messrs. W. H. ALLEN and Co., Book Agents of the Society in London, forwarding account sales of the Transactions and Oriental publications, together with a statement of books supplied by them to the Society, exhibiting a balance of 16*l.* 12*s.* 2*d.* in their favor.

Library.

Read a letter from J. VAUGHAN, Esq. Librarian, American Philosophical Society, forwarding the following books for presentation to the Society :—

Transactions of the American Philosophical Society, vol. 6th, part 2nd., New Series.

Memoir of Dr. P. S. PHYSICK, by J. RANDOLPH, 1 vol.

Proceedings of the American Philosophical Society, Nos. 3, 4, 5, and 6.

Medical Statistics from 1821 to 1830, by G. EMERON, Esq.

Read a letter from Mr. J. AVDALL, forwarding for presentation a copy of an Armenian and French Grammar.

Read a letter from H. T. PRINSEP, Esq. Secretary to the Government of India, forwarding 50 copies of the Rev. W. TAYLOR's examination and analysis of Colonel MACKENZIE's Manuscripts.

The following Books were presented :—

Bulletin de la Société Géographique, vol. 10—*by the Society.*

Proceedings of the Geological Society, Nos. 60 and 61, with a list of its Members—*by the Society.*

Proceedings of the Committee of Commerce and Agriculture of the Royal Asiatic Society—*by the Society.*

Transactions of the Society of Arts, &c. vol 52, part 1st.—*by the Society.*

Crisp's observations on the abolition of the Impress System in two letters, addressed to J. W. COOPER, Esq.—*by the Author.*

Ditto, Treatise on Marine Architecture.

Notice Historique sur la vie et les Voyages de Réné Caillie, par M. Jomard, Paris, 1839.

L' Inde Française ou collection de dessins Lithographiés, representant les Divinités, &c. &c. des peuples Hindoues qui habitent les possessions Françaises de l' Inde, et en général la Cote de Coromandel et de Malabar, par M. J. J. Chabrelie, avec un texte explicatif, par E. Burnouf et E. Jacquet. Paris, 1827 et 1835. Tome 1st and 2nd, folio, 2 copies—*from the Government of India.*

Recherches sur les Ossemens Fossiles, par G. Cuvier, 4th edition Paris, 1834 à 1837, 8vo.

Atlas, a ditto ditto, en Livraisons.

Le Regné Animal distribué d' aprés son Organisation, par G. Cuvier, Paris, 1835, Liv. 49 Molusques, 10mo. Liv.

Compendium Logicæ—*presented by the Bishop of Isauropolis.*

The following books were received from the Booksellers:—

Royle's Illustrations of Botany, part 10th.

Lardner's Cabinet Cyclopædia; History of England.

Alif Leila, 5 copies—*subscribed for by the Society.*

The Officiating Secretary laid before the Meeting the Second Part of the 19th vol. of the Transactions of the Society.

Mr. BOUCHEZ, the assistant Librarian of the Asiatic Society, submitted to the Meeting a Manuscript Catalogue of the Society's books, with a request that it be printed.

Resolved—That the Catalogue be referred to the Committee of Papers.

SHAH KABEER UDDEEN laid before the Meeting a Manuscript copy of the *Zeech Bahadur Khanee*, with a request that the Society would join him in paying half the expense of its printing, on the same footing as it has done towards the printing of the *Sharya ul Islam.*

Resolved—That a Committee be formed consisting of Mr. H. T. PRINSEP, Mr. J. C. C. SUTHERLAND, Mr. JOHN CURNIN, Mr. JAMES MIDDLETON, and the Rev. H. PRATT, to report as to the merits of the work.

Museum.—Note by Dr. M'Clelland:—

"Skeletons, presented by the King of Oude, of an Elephant, of a Camel, and of a Tiger. The first has been indifferently prepared and worse treated, the cartilages and apophyses are detached, the former as well as some of the caudal vertebræ, and the last range of tarsal and carpal phalanges are altogether wanting.

The Camel, otherwise a valuable addition to our Museum, wants the entire caudal vertebræ, together with two pieces of the sternum, anterior part of the jaws, and corresponding teeth, together with some of the tarsal and carpal phalanges, cartilages of the ribs, &c.

The Tiger wants two caudal vertebræ, a femur, and twenty-two phalanges of the tarsus and carpus.

Skeleton and skin of a Kangaroo prepared from a specimen presented by Mr. H. T. PRINSEP.

The skin of a Boa, twenty feet long, presented by Ensign R. W. BIRD, 4th Regt. N. I. with the following note from the Hon. Mr. WILLIAM WILBERFORCE BIRD.

'I have the pleasure to forward the skin of a Boa, which I have been requested to present on the part of Ensign ROBERT WILBERFORCE BIRD, of the 4th Regt. N. I. for the Museum of the Asiatic Society.

When the Boa was shot, it measured 21 feet, in length. It had swallowed a spotted Deer, which was taken out of the inside, not too much decomposed for the spots in the skin to be quite distinct. Where the Deer was, the skin measured three feet one inch across.

(*Signed*) W. W. BIRD.'

An adult specimen of Artonyx from Assam where they are common, presented by Captain JENKINS, and the more valuable as that in the Museum appears to be a young ungrown animal."

Oriental Publications, Antiquities, &c.

Read a letter from J. MUIR, Esq. recommending to the Society to procure a copy of the *Pseudo-Vedas*, composed by the Romish Missionaries on the Coromandel Coast.

Seharunpoor, August 13th, 1839.

MY DEAR SIR,—I last year wrote to Mr. PRINSEP and the Rev. Professor MALAN, former Secretaries to the Asiatic Society on the subject of the *Pseudo-Vedas*, composed by the Romish Missionaries on the Coromandel Coast, in the hope that steps might be taken by the Asiatic Society to procure from Madras or elsewhere a manuscript copy of the work, for their own library. I now take the liberty of addressing you on the same subject, and of offering the sum of 25 Rupees towards the purchase or transcription of the manuscript, if the Asiatic Society of Bengal see fit to adopt any measures for this purpose.

The Society has already admitted into the 14th volume of its Researches a Dissertation on the subject of these *Pseudo-Vedas*, and the literary interest attaching to them, is, I think, sufficient to justify this application to the Society, to take steps for rendering them accessible to its members. It seems, at the same time, to be desirable that the reasonings of the Romish Missionaries on the subject of their discussions with learned Hindoos should be brought within the reach, and made available for the use of those who are labouring to promote the same cause at the present day.

I remain, My dear Sir,
Yours faithfully,
J. MUIR.

J. C. C. SUTHERLAND, Esq.
Secy. As. Soc. Bengal, &c. &c.

Resolved—That the Secretary be requested to address the Rev. DR. WILSON of Bombay, soliciting his aid in obtaining a copy of the work.

Read a letter from L. WILKINSON, Esq. urging the printing of the *Siddhants*.

To W. B. O'SHAUGHNESSY, Esq.

Officiating Secretary to the Asiatic Society, Calcutta.

SIR,—I have the pleasure to forward to you by Dawk Bhanghy four copies of a very admirable little disquisition on Caste, by a learned *Boodhist* of olden times, who exposes the weakness of the arguments on which the institution rests, in a most irresistible manner. I beg you will be so good as to present one copy in my name to the Society, and accept another for yourself.

The other two I beg you will present to any gentlemen most interested in exposing the evils of the institution. They will no where find arguments of a like cogency to a native's apprehension. They will do well therefore in studying the work.

I shall be very much obliged to you if you will let me know what your Society thought of my proposition for printing the *Siddhants*, the *Gruhun Laghuvu* with *Mullaris Teeka*, and the *Rekha Gunit*. Since I wrote to you I have been favoured by some friend unknown to me, with a copy of the *Beeja Gunit* or *Algebra* of *Bhascur Acharyu* printed at Calcutta, thus only three instead of four works remain to be printed. I lately submitted a proposal to Government and also to the Agra School Book Society to the like effect, as I did through you to the Asiatic

Society. The Agra School Book Society are most anxious to get these works printed, and Lord AUCKLAND I understand received the proposal favourably. By all parties agreeing to take a certain number of copies, the share of the expense on each will be too trifling to deserve consideration.

Believe me, My dear Sir,
To be yours very faithfully,
L. WILKINSON.

Resolved—That the subject be referred to the Committee of Papers.

Read an application from NEEMCHAUND SHEEROMONEE, demanding remuneration for correcting the proofs of the *Mahabharata*.

Resolved—That the application be referred to the Committee of Papers.

Physical.

Read a letter from Messrs. FRASER, MACDONALD and Co. forwarding a claim of Mr. W. SCOTT of Singapore, for Co's. Rs. 240-3-9 for expenses incurred by him in keeping the register of the tides of that place.

Resolved—That the Society recognize and discharge this claim in question.

Read the following letter from Mr. SCONCE regarding some Geological specimens forwarded to the Society.

MY DEAR SUTHERLAND,

I am despatching to you some things that look like Geological specimens, and from the circumstances under which they were found, what I infer to be relics of some of the ancient epochs which mark a Geologist's History of the world. The largest and most important—if it be real—of the specimens, seems to be the remains of an animal of the turtle kind; though in a much larger scale than the modern turtles or tortoises. The size however will not disprove identity, if there be other marks sufficient to guide the judgment of one acquainted with Natural History. I knowing nothing of such matters, am merely led by the appearances which the specimen exhibits of animal conformation—the shape and relative position of the parts, and the peculiar marks of some of the parts are such, as not I think, to be inanimate concretions accidentally formed in a sand hill. The specimen was broken before I discovered it—and I sent my gardener with insufficient instructions to dig out the remainder. He brought me consequently a heap of fragments, and what I send you are such parts as I could put together. I have packed the pieces in such a manner that you will be able, I dare say to trace the form they assume. When put together, they form two distinct portions, and of these I shall enclose pencil sketches that may help you to "pick up the pieces." I send also several unconnected bits of the same specimen; in one of these you will detect distinct traces of a claw—and in another what looks like a paw in relief. In this latter you will observe corroborative evidence of animal existence in the evident delineation of five fingers or toes, and also marks of spurs or nails. I send also in another box an *entire* fragment—that is, a portion just as it lay in the hill. My idea of the specimen is that it exhibits the external form of the animal, and the fossilization as we now see it, was effected during, or in consequence of, animal decomposition. I cannot detect how far the hardened mass may be a type of the—so to call it—turtle shell. The last specimen I have mentioned will shew you that the fossil was, as it were, a case or mould—enclosing fine white sand. Externally it was included in a stratified deep brown sand hill, to the depth of forty or fifty feet below the surface.

I also send a piece of charred wood, I found it in a position which makes me attach to it some importance. I discovered it in a bed of firm blue clay beneath successive strata of sand and clay, and some twelve or fourteen feet from the surface. The site externally is a swelling hillock. But the most extraordinary circumstance attending this specimen is, that while it was imbedded in and beneath strata that must have been deposited while the surface was exposed to repeated inundations, if not uninterruptedly overflowed, there are what I take to be undoubted marks of heat and fusion—not merely in the wood being charred—but in a *fused crust* an inch or two above where the wood lay. This crust generally speaking is not the thickness of two rupees: but is spread as regularly as any of the layers of clay and sand. I observed however that it seemed to *run* as fused matter generally does, making its way into crevices, and gathering into a mass. But what satisfies me more strongly of the fused origin of this crust, is that just above the charred wood—an inch or two,—it appears to have *trickled* in a state of fusion *through* the clay, making a hole for itself scarcely a quarter of an inch wide. I send specimens of the clay, the crust, and of that portion of the clay, through which the fusion ran. I suppose that the heat from the fused liquid above was sufficient to char the wood. Willing to send you the specimen as entire as possible, I have not scraped it or cleared it so as to ascertain the appearances of the wood.

There are also some smaller specimens of what I suppose to be quondam shell-fish. One I am told is a muscle—if a shell, it is at all events a bivalve: the two shells separate—and the one is flossy looking. These shells I found also in a strata of clay and sand more or less hard—and it seems odd, that when broken, they emit a strong *sulphureous* smell. I am too ignorant on such subjects to know whether these things have any value; you will judge when you see them, and if worth while, I should be glad, if you offered them to the Society.

I am
Yours very sincerely,
A. SCONCE.

Before the Meeting broke up Dr. O'Shaughnessy, exhibited several Photogenic drawings prepared by himself, and in which a solution of gold was the agent employed. A more detailed notice of the experiments described will appear in a subsequent number.

[We cannot dismiss the subject of the Proceedings of the October Meeting, without adverting to their having been distinguished by the first exhibition in the Society's apartments of Colonel M'Leod's, magnificent model of the Nizamut Palace of Moorshedabad. We strongly recommend all those who can value a first rate practical lesson in classical architecture to visit this triumph of taste and skill. Aided by the "Report by the Surveying Committee," published in our last number, the visitor can acquire by an hour's study more correct ideas on some of the noblest features of the Orders observed in this structure, than he could derive by any amount of study, from books or plates, or could gain without great difficulty, even from the building itself.—Eds.]

JOURNAL

OF

THE ASIATIC SOCIETY.

No. 93.—SEPTEMBER, 1839.

ART. I.—*Sanscrit Inscription on the Slab removed from above the Kothoutiya gate of the Fort Rohtas. By the Editors.*

In our May number, we presented our readers with an interesting letter from Mr. RAVENSHAW, communicating some inscriptions collected in *Behar*. Mr. RAVENSHAW notices the Persian Inscription over the gateway of the palace on the summit of the fort of *Rohtas*. This informs us that the palace was built by RAJA MAN SING. The date of the inscription is the 28th day of the 7th month of 1005, H. Æ., or about the middle of April, 1597 A. D. Mr. RAVENSHAW adds, that the Sanscrit inscription over the Kothoutiya gate of the fort had been taken to *Chupra* by Mr. W. EWER, and was then on the premises of Mr. LUKE. It has since been forwarded to the *Asiatic Society*, and we are thus enabled to present our readers with a transcript and translation.

The inscription gives the following genealogy of the TOMARA family for eleven generations, and twelve Rajas.

VIRA SINH,
UDDHARAN,
GANA PATI,
HANGARA SINGH DEVA,
KIRTI SINH,
KALYANA SAHI,
MANA SAHI,
VIKRAMA SAHI,
RAMA SAHI,
SALI VAHANA, left two sons.
SYAMA SAHI and VIRA MITRA SEN.

VIRA MITRA SEN, the last, succeeded his brother, and is stated to have conquered from SHER KHAN the fortress of *Rohitaswa*,—to the great astonishment of the Emperor of *Delhi*. He rebuilt it, and it became known by his name. He erected in it a row of lofty temples, in which he located SIVA under the name of MITRESWARA, and he also in 1688 Sumbut, or 1631 A. D., built a palace and a *Mundira* in which he located DURGA, and it was by his order that the Poet SIVA DEVA of *Maithila* (celebrated at the Court of *Delhi*) composed, in honor of his illustrious family, the verses which were found engraved over the *Kothoutiya* gate. This is named from the neck of rock which joins the hill to the table land. BUCHANAN mentions this inscription,* but evidently was not acquainted with its contents. He describes it as confirming the facts obtained from the Persian inscription, and as contemporary with it. But in reality there is no mention of the Viceroy MAN SINGH, and the date 1654 Sumbut, quoted by BUCHANAN, seems to have been obtained by the addition of 57 to 1597, the Christian year which corresponds with 1005, H. Æ. in the *Sanscrit* inscription the figures 1688 are very distinct, and this year also results from the conventional numeral words used, "*vasu dwana shat chandra.*"

The bold assertion that VIR MITRA took the fort from the formidable SHER KHAN is not justified by history; and if we assume on the evidence of the stone, as we perhaps may, that VIR MITRA was living in 1631 A. D. it is impossible that he could have been opposed in war to the celebrated *Pathan* emperor who died in 1540. We are left then to surmise that VIR MITRA SEN may have been a native chieftain of that part of *Behar*, and perhaps entrusted by the *Mohammedan* ruler with the charge of the fort. The invention and adulation of the poet has supplied the rest.

Though the slab should be thus convicted of error and exaggeration, there may still be some historical facts pointed at. In the 7th verse the grandfather of VIR MITRA's great-grandfather is represented to have sustained the king of *Yavanapura (Jionpoor),—the king of the east*, against the emperor of *Delhi*. The dominion of the *Jionpoor Muslim* kings extended to *Behar*. Allusion is probably made to the emperor BELOLI, and HOSEN SHAH the king of the East. After a long struggle the latter was in 1478, driven to seek shelter with ALLAHUDDEN the ruler of Bengal. It may be observed that the Hindus applied the term *Yavana* to denote their *Afghan* invaders, though this term properly belongs to the Greek or *Ionian*. We have in

* Buchanan, vol. iii. p. 432.

rendering the seventh stanza, ventured to construe the concluding part as alluding to the use of artillery, by the modern name of *top*. The words admit of a different version, and we are not satisfied that we are justified in the liberty taken. MANA SAHI, the father of the great-grandfather of VIRA SINGH, was the lord of *Gopachala*, indicating probably a neighbouring hill fort. If any gentleman near *Rohtas* would institute an inquiry as to whether any of the *Tomara* family there still exists, and if their family traditions or records in any way square with the particulars of the inscription,—an important service would be rendered.

We learn from the 12th verse, that JALALUDDIN ever designated MITRA SEN and his brother as 'the unique heroes.' JALALUDDIN was the name of AKBAR, who died in 1605 A. D. The style of these verses is modern, and their merit is rather mediocre.

SHER KHAN is stated by BUCHANAN to have taken the fortress of *Rohtas* by surprise. He mentions that the tradition is, that it was wrested in 1534 A. D., from the last *Hindu* Emperor of *Hindustan*, a descendant of PRATAPA DEVALA,* to whose family the fort belonged. On what authority BUCHANAN has elevated the descendant of the chieftain of *Japila* into the last Hindu emperor, does not appear. In closing this article, we would remark that the Rohtas slab gives a useful lesson of caution to distrust panegyrical inscriptions.

The removal of slabs from ancient buildings and temples has been condemned by the good sense of the Asiatic Society, and we suggest that the Rohtas slab should be restored to its proper place.

तस्यैनमः ॥

स्तुत्वा वागीश्वरीयं चरणसरसिजं कृष्णदेवञ्च नत्वा
कृत्वा चित्ते गणेशं त्रिभुवनजननीं भावयित्वा च दुर्गां ।
वीरश्रीमित्रसेनक्षितिमुकुटमणेराज्ञया पाण्डुवंशे
सुख्यातान् गोणवंश्यानहमिह कियतः कीर्त्तितः कीर्त्तयामि ॥१॥

* See our May No.

विख्यातः सोमवंशः समभवदथ यः पाण्डुवंशस्ततोभू
द्वंशः श्रीतोमराणां समरविजयिनां कोटिशो यत्र वीराः ।
तत्र श्रीवीरसिंहः समजनि समरे येन जित्वा नरेन्द्रान्
दुर्गे गोपाचलाख्ये व्यरचि शतमुखी प्राज्यसाम्राज्यलक्ष्मीः ॥२॥

पुत्रस्तस्यानु भूपः समभवदवनीमुद्धरन्नुग्रतेजाः
श्रेष्ठै र्विद्वद्भिरुद्धरण इतिकृतं नाम यस्योचितार्थं ।
तत्सूनु र्वैरिवीरक्षितिपतिदमनाद्वीरमो वीर एकः
श्रुत्वा यद्वीरभावं सुरपतिरधिकं कम्पवान् स्तम्भितो भूत् ॥३॥

तस्य प्रत्यर्थिपृथ्वीपतिनतिविवलन्मौलिमालाङ्घ्रिपद्मः
पद्माविश्रामभूमिर्गणपतिरभवत् सूनुरन्यूनतेजाः ।
यस्मिन् गोपाचलस्थे कथयति समभून्नैव दिल्लीश्वराणां
चेतोऽप्यत्र प्रयातं किमुत बलमहो कोऽपि यस्य प्रभावः ॥४॥

तत् सूनुः समभूदपूर्वमहिमा हेमाद्रिवत् सुस्थिरः
संग्रामेऽर्थिजनस्य दैवततरुः श्रीशौर्य्यधैर्य्याश्रयः ।
यः सिंहोल्पमृगानिवारिनृपतीनुन्मर्दयन् दोर्बलात्
प्राप्तो ह्यङ्गुरसिंहदेवपदवीं ख्यातां जगन्मण्डले ॥५॥

तत् पुत्रः कीर्त्तिसिंहः समजनि न भयाद् यस्य संग्रामलीलां
चक्रुर्वैरिक्षितीन्द्रास्त्यजगति विदितौ यस्य दानप्रतापौ ।
यस्मिन्नेकान्तचित्ते भजति हरिहरौ कम्पिता शक्रलक्ष्मी
र्यद्दोर्दण्डप्रचण्डं धनुरभजदहो चण्डगाण्डीवशोभां ॥६॥

श्रीमान् कल्याणसाहिः समजनि तनयस्तस्य यस्य प्रसादात्
संग्रामे प्राप्य कान्तात् सुरपुरवनितानन्दनान्तःस्फुरन्ति ।
सौख्यं दिल्लीशमाजौ करितुरगघटाटोपसंघट्टमध्ये
द्राग् जित्वा शत्रुसेनां यवनपुरपतिं स्थापयामास राज्ये ॥७॥

तत् सूनुर्मानसाहि र्दिग्विदिग्विदितोऽमदानप्रतिष्ठः
शक्रोऽयं किं कुवेरो बलिरिति विदुषां संशयो यच्च वृत्तः।
यस्मिन् गोपाचलेन्द्रे विजयिनि विविधां कीर्त्तिमुद्गातुकामा
प्रोद्यत्संगीतरागा ध्रुपदशतपदा भारती संबभूव ॥८॥

श्रीमद्विक्रमसाहिरद्भुतयशास्तत् सूनूरासीदभि
प्रोद्यत् प्रौढतरप्रतापतपनप्रोत्सारितारिव्रजः।
यद्दानेन सुरद्रुमादिरभजत् काष्ठायितो मूकतां
यत् कान्त्या तुलितः सुधांशुरभवद् व्योमाश्रितो लाघवात् ॥९॥

श्रीरामसाहिरभवत्तनयोऽथ तस्य
प्रत्याशमुल्लसितविक्रमशौर्य्यधैर्य्यः।
यन्नामनि श्रुतिपथातिथितामुपेते
सद्योधनुः स्खलति पाणितलात् परेषां ॥१०॥

श्रीशालिवाहन इति प्रथितोऽस्य पुत्रः
प्रख्यातकीर्त्ति रतिदानदयाविवेकैः।
यः सङ्गरे बहुविधान्नृपतीन् निहत्य
प्राप्तः सुरेश्वरविभूषितमासनार्द्धं ॥११॥

तस्य श्रीश्यामसाहिः क्षितिमुकुटमणिर्मिचसेनश्च पुत्रौ
त्रैलोक्यख्यातकीर्त्ती प्रतिबलजलधेरन्तरौर्वायमाणौ।
दाने युद्धे दयायां हरिहरचरणाम्भोजपूजाप्रसक्तौ
नित्यं यावेकवीरौ कथयति सततं साहि जल्लालदीनः॥ १२ ॥

तत्र श्रीश्यामसाहिर्दिवमगमदभिद्योतयन् स्वर्गमार्गं
प्रह्लादोवाम्बरीषो बलिरिति किमुवेत्येवमुक्तोमुनीन्द्रैः।
वीरश्रीमिचसेनः क्षितिपतिरनुजस्तस्य तद्विप्रयोगे
व्यर्थोऽप्युद्यैः प्रतापैः प्रतिनृपतिचमूं त्रासयन् पाति पृथ्वीं ॥ १३ ॥

यःप्रद्योत् प्रौढवीर्य्यो भुजबलविबलङ्गीमसेनो बलेन
द्राग् दुर्गं रोहिताश्वे स्वकमहत हतौ सेरषानं विजित्य।
नैतत् कोऽपि व्यधासीदिति चकितमतिर्वीक्ष्य दील्लीश्वरोऽपि
प्रोवाचान्येपि वीराः समरविजयिनो विस्मयं प्रापुरुच्चैः ॥ १४ ॥

अस्य श्रीमित्रसेनक्षितिमुकुटमणेर्दानसङ्कल्पवार्भि
र्विद्वद्वारिद्र दावानलवद्बलशिखाशान्तिमभ्याजगाम।
उत्पन्ना साथ वैरिक्षितिपतिभवने तद्वधूनेत्रनीर
प्रौढप्रोद्यत् स्रवन्तीततिभिरपि भृशं म्लानिमानं प्रपेदे ॥ १५ ॥

सोऽयं श्रीमित्रसेनक्षितिमुकुटमणिर्भूतले कल्पवृक्षो
दुर्भिक्षोपद्रुतानामशनभरणयोर्ब्राह्मणानां प्रदानात्।
दायंदायं तुलाभिस्तुलितमगणितं स्वर्णरौप्यादि वेश्म
प्रोच्चैर्निमाययित्वा द्विजवरतिलकं स्थापयामास काश्यां ॥ १६ ॥

एवं दाता वदान्योवलगुणनिलयो मित्रसेनो नरेशो
भग्नं श्रीरोहिताश्वं नवमहत हतौ यस्य नाम्नैषदुर्गः।
किञ्च प्रोच्चैर्विधायोद्भटमठघटनां तत्र मित्रेश्वराख्यं
शम्भुं संस्थाप्य दिव्योपवनमिह जयन्नन्दनादि व्यधासीत् ॥१७॥

सौधं भूमीन्दुचूडामणिरहत वसुद्वन्द्व षट्चन्द्र १६८८ संख्ये
वर्षे श्रीविक्रमार्कक्षितिपतिगणिते संवते सम्मतश्रीः।
हत्वैतन्मन्दिराख्यं त्रिभुवनजननीं स्थापयामास दुर्गा
मेतत् काव्यानि चक्रे मिथिभुवि विदितः कृष्णदेवात्मजन्मा ॥१८॥

दील्लीन्द्रादिसभासु लब्धयशसो वैदेहभूमीभुवः
श्रीकृष्णार्पितचेतसस्त्रिजगतीं तत्त्वेन संपश्यतः।
धीरश्रीशिवदेवपण्डितकवेः पद्यानि हृद्यान्यमू
न्यानन्दं जनयन्तु सत्सुमनसां पीयुषधारा इव ॥ १९ ॥

अस्ति त्रैलोक्यलोकोत्तरविधिरचनादृष्टदृष्टान्तसारः
प्राकारैः स्वर्णभूमीधरइव विलसत्सौधसौधाधरश्रीः।
मूर्द्धा विन्धस्य दिव्योपवनघनपुरीकूपकासारहारः
सर्व्वान्नोत्पत्तिभूमिर्भुवनभयहरो यत्र विप्रो गदेन्द्रः ॥ २० ॥

सन्तः सन्तोषमुदिता राजानो धर्म्मतत्पराः।
प्रजाश्च सुखिताः सन्तु, सुभिक्षञ्चास्तु सर्व्वदा ॥ २१ ॥

शुभमस्तु श्रीरस्तु ॥

TRANSLATION.

1. Salutation to Her. By the order of the hero, the illustrious Mitra Sen, a gem on the diadem of the universe, I eulogize for their glory, some celebrated scions of the Gona race in the lineage of Pandu, having first praised the lotus of the feet of Saraswati, and having prostrated myself before the divine Krishna, meditating on Ganesa, and contemplating Durga, the mother of the universe.

2. Renowned was the Lunar race. From the lineage of Pandu sprang the Tomaras, victorious in war,—in which are millions of heroes. In this was Vira Singh born, by whom, when he had conquered kings, were wrought many imperial fortunes looking in a hundred directions.

3. His son was that great hero of resplendent glory, to whom the wise had fixed the appropriate name of Uddharan, as if upholding the world. His son was Virama, a hero singular from his subjection of hostile warrior kings. Hearing of his prowess, Indra, trembling excessively, stood aghast.

4. His son was the illustrious Gana Pati, the shrine of the lotus-born goddess, at whose feet glided the coronal gems of hostile kings in their prostrations. Of whom, how vast was the power; placed as he was in his fort, and saying—"the thought even of the lords of *Delhi* never reached this place."

5. His son was unprecedently great, firm in war, like the snow-clad mountain,—the divine tree to the supplicant—the asylum of valor and constancy; who crushing by force the kings his enemies, as a lion does the deer, got the title of Hungara Singa Deva, celebrated throughout the world.

6. To him, a son KIRTI SINGH was born, from fear of whom, kings ceased to fight,—whose liberality was celebrated in three worlds,—whom intently adoring HARI and HARA, trembled the fortune of INDRA,—in whose brawny arms a terrific bow rivalled the grace of the awe-inspiring arc of ARJAUN.

7. To whom was born an illustrious son KALYANA SAHI, by whose favor the nymphs of paradise, in the bower of INDRA, revel in joy with lovers obtained by the fate of war—who happily established in his kingdom the lord of *Yavanapur*, after he had quickly overthrown in war the king of *Delhi* and his hostile army, in the conflict of artillery and squadrons of horse and elephants.

8. His son was MANA SAHI, renowned in every quarter, and celebrated for his generosity. "What is this INDRA, KUVERA, or BALI?" Such were the doubts of the learned: while him the lord of *Gopachala* conquering,—BHARATI in strains of ascending melody modulated in the different harmonic notes loved to celebrate his complicated glory.

9. His son was VIKRAMA SAHI, surpassing fame—the crowd of whose enemies was dispelled by the heat of his intense and culminating glory;—in consequence of whose liberality, the divine tree and other sources of gifts withering as it were, became abashed.

10. His son was RAM SAHAI, whose prowess, valor, and perseverance, shewed in every quarter,—at whose name, a guest unwelcome to their cars—forthwith slipped the bows from the palms of his enemies hands.

11. His son was SALI VAHANA, celebrated for his excessive generosity and clemency,—who when he had in war overthrown many kings, shared the throne, graced by the regent of the gods.

12. His sons were SYAMA SAHI, a gem on the diadem of the universe, and MITRA SENA, renowned in the three worlds,—volcanoes in the ocean of their enemies' army,—fervent in gift, war, and mercy—and votaries of the lotus of the feet of HARA and HARI.—Ever does JALALUDDIN SHAH designate them as unique heroes.

13. SYAM SAHI died illuminating the roads of heaven, designated by holy saints as PRAHLADA AMBARISHA or BALI. On his death, VIRA MITRA SEN the younger brother of that monarch, though grieved, protects the world, awing the armies of hostile kings by his intense majesty.

14. Apt to baffle the martial throng by force of his arm,—which experienced warrior of unrivalled prowess, having conquered SHER KHAN quickly made his own the fort at *Rohitaswa:* beholding that, the

astounded emperor of *Dèlhi* exclaimed, no one has ever effected the same—other conquering heroes also felt intense astonishment.

15. On occasion of his vows of gift, by the libations of that MITRA SEN, a gem on the diadem of the world were extinguished—the many flames issuing from the fire of the poverty of the learned. That produced in the house of hostile kings, often was suppressed by streams of tears profusely gushing from the eyes of their wives.

16. From his donation of support and food to famine-striken Brahmins, a divine tree on earth—that MITRA SEN, a gem on the diadem of the world, repeatedly giving precious metals, not counted, but weighed, when he had constructed a house at *Kashi*, established in it a pre-eminent Brahmana.

17. So generous, eloquent, and the shrine of valor and virtue—MITRA SEN, by whose name this fort is known, rebuilt the decayed *Rohitaswa*, having erected a row of lofty temples. He located in them an image of SIVA under the name of MITRESWARA, and made a divine garden here surpassing the bower of paradise.

18. In the year 1688 of the era of the king VIKRAMARKA, that gem on the crest like the moon of the world, constructed the palace. Having constructed the building denominated *Mandira*, he located in it DURGA, the mother of the three worlds. These verses were made by the son of KRISHNA DEVA, known in the *Mithi* territory.

19. Like streams of nectar to gods, may these verses impart delight to virtuous men,—these verses of the poet SIVA DEVA, celebrated in the court at *Delhi*, born in the *Vaideha* province, a votary of SRI KRISHN, contemplating as reality the three worlds.

20. Like a golden mountain with its ramparts, is the summit of *Vindha*, whose palaces reflect the beauty of the nectar-fraught luminary—the epitome of similies exhibited in composition according to the rules most approved in the universe,—abounding in bowers, dens, lakes, wells, and pools,—a land of plenty, dispelling worldly fear, where lived the Brahmun GADENDRA.

21. May the virtuous be gratified—kings intent on the law—the subjects happy—and may there always be abundance.

Be there welfare and good fortune.

ART. II.—*On Camel Litters for the Wounded.*—*By* H. PIDDINGTON, ESQ.

To the Secretary to the Government of India, Military Department.

SIR,—I have to beg you will do me the honor to submit, for the consideration of the Honorable the President in Council, and, if approved, for transmission to the Right Honorable the Governor General of India, the accompanying Memorandum and sketches. The importance of the subject to the interests of humanity, and to the movements of a military force, will, I trust, excuse the intrusion of it upon his Honor's attention.

CALCUTTA,
15th February, 1839.

I have, &c.
H. PIDDINGTON.

Memorandum.

In the countries towards which the Army of the Indus is now advancing, it is nearly certain that no extra dooly-bearers for the carriage of the sick and wounded can be procured; and of even those taken with the force, it may be doubtful if they can be kept long together should the advance be prolonged far beyond the frontier. The sick and wounded then would, in this case, be left without the means of carriage, and not only many valuable lives might be so lost, but important military operations might be greatly impeded, or even prevented. I found the other day, in the course of my reading, what appears to be so simple and cheap a plan of providing against this cruel aggravation of the miseries and losses of war, that I am induced to lay it before the Right Honorable the Governor General, not doubting that he will allow it a trial.

The plan I allude to, is in the "Memoires de Chirugie Militaire du Baron Larrey," a name standing so high in the annals of his profession for every talent and virtue which can adorn it, that nothing falling from his pen can be unimportant. I translate here the passage, which is found in vol. i. p. 278, of the "Campagnes d' Egypte."

Preparations for the campaign in Syria were ordered—

"The Medical Staff assembled to concert the necessary arrangements for their branch of the service in the army destined for this campaign. I was particularly occupied in providing every thing necessary to insure assistance to the wounded whom we might expect on such a painful and perilous expedition. The means of carriage were the first object of my attention, for merely dressing the wounded on the field of battle was

insufficient; they were moreover, to be placed out of the reach of the Arabs, and to be saved from the horrors of hunger and thirst, to which they would have been exposed if not promptly carried off. We had to employ for this purpose the camel—the only beasts of burden in the country; and to render the means of carriage easy for the wounded, as well as light for the animals, I had a hundred baskets* made cradle-wise, two for each camel, which were carried, one on each side, suspended by elastic straps. They were so made that they did not in the least impede his paces, or his movements, and yet were long enough, by means of a lengthening flap on hinges at one end, to carry a wounded man lying down at full length."

In adopting this plan, the simplest methods seem to be those most likely to succeed, and to be least subject to get out of order; and I should suggest that a few be made of basket-work—nothing is so durable as the entire ratan if it can be procured,—as well as some of the frame-work kind shewn in the drawing.

For the simplest sort a cradle-like basket, higher at one end to raise the head comfortably, and a tarpaulin for rainy weather, seem to be all that is necessary. The straps or slings for this, should, I think, be fastened to bent iron bars going *round* the cradle, (not fastened to the sides of it,) and turned into a ring at the *inner*, *upper* side, sufficiently strong and properly placed. A spare ring or two may be added when necessary for steadying the whole, and a short plank should be placed outside across the bottom, where the iron bars take, that they may not cut in upon the basket.

A frame of light wood, with a corded net-work bottom, should be placed inside, and a quilted mattrass and covering; the last pretty wide, so as to be doubled if required, will be sufficient for the inside. There should also be two pillows, one for the head, and another to lay at the side, if required by the patient to steady himself against the motion of the animal.

Any intelligent officer accustomed to Camel-carriage will be able to arrange the lesser details of the necessary ropes, spare slings, &c. as well as the fitting of the curtain and tarpaulin, and a medical officer will easily add those necessary for the safety and comfort of the wounded and sick.

H. PIDDINGTON.

CALCUTTA, 12*th February*, 1839.

* "*Paniers disposés en forme de berceau*" are the words used; though the Baron's plate represents frames with curtains, which would have been expressed by the words "*Cadres avec des rideaux.*" Probably the plate may represent a better sort for the officers, and the Baron has forgotten to mention this?

MILITARY DEPARTMENT.

To the Officiating Secretary to the Government of India, Military Department, Calcutta.

SIR,—I have had the honor of receiving and laying before the Right Honorable the Governor General your letter No. 473 of the 25th ultimo, with its enclosures herewith returned, from Mr. Piddington, submitting a memorandum, with sketch of a Camel litter for the conveyance of the sick and wounded in the Army of the Indus.

In reply, I am instructed to convey the expression of His Lordship's acknowledgments to Mr. Piddington for his useful communication, a copy of which will be forwarded to His Excellency Lieut.-General Sir John Kean, K. C. B. Commanding the Army of the Indus, for information.

J. STUART, *Lt. Col.*

ART. III.—*Note by* DR. KEAN *of Moorshedabad, on* DR. STEWART'S *Table of Mortality among Hindu Females.*

To the Secretaries of the Asiatic Society.

SIR,—The table furnished by Dr. Stewart, and published in the Journal of the Society for April last, may be expected to attract much attention. Its results are unexpected and startling. Considering the ignorance that prevails on the subject of Indian statistics, the unexpectedness of such information may be no argument against its accuracy; but the frightful mortality which the Table exhibits as arising from one source, will lead many to doubt its correctness, and all, to *wish* that there may have been some error in the data on which it is based.

We learn from the Table that *one-fifth* of the female population of Bengal die in childbed. But we know that only a *portion* of the female population *can*, during any given period, suffer from this cause of mortality. This portion might perhaps, without involving much error, be estimated at *one-third* of the whole; and if so, a mortality amounting to *one-fifth* of the female population will be equivalent to *three-fifths* of the portion actually liable to that cause of mortality;—in other words, out of every *five* of the mothers in Bengal, *three* will die in childbed.

It is not however by arguments of this kind, nor indeed by arguments of any kind, that the truth of the Table can either be established or overturned. A census ought to be taken, and accurate

registers kept, of such casualties as occur within the limits. A general census, though desirable, is not absolutely necessary on the subject.

In replying to the inquiries of the Secretary to the Prison Discipline Committee, the writer of this took the opportunity of suggesting the advantages that might be obtained from taking the census and keeping registers in particular Zillahs, or in limited districts around every Jail. It is obvious that such registers would have been available for many purposes, but the advantage then mainly insisted upon, was the facility that would have been afforded for comparing the mortality in the Jails, with that in the surrounding districts. It is understood that the suggestion was referred by the authorities to the Sudder Dewanny, who discouraged it, on the ground that it would lead to vexatious domestic intrusions. Convinced that the plan might be carried into execution without causing either vexation or annoyance, he selected a village containing 762 inhabitants, in the neighbourhood of the Moorshedabad Jail, and kept a register of the births and deaths for one year. During this period no death occurred from childbirth. Next year the register was made to include another village, embracing altogether a population of 2,778 persons, and during this period there was entered only one death in childbed. The registers for the first year were placed in the hands of your late Secretary by Mr. Adam, and are doubtless to be found among the papers of the Society.

These registers are not alluded to here as any authority on this subject, but merely as a practical evidence that they can be kept without causing trouble or inconvenience to any one. It is to be hoped, therefore, that Government will speedily institute measures for ascertaining the truth on this important question.

The above observations are by no means intended to convey the idea, that the mortality among native females from the cause assigned is not very great, on the contrary, it is believed to be excessive; nor is it likely to be otherwise till means are taken to disseminate among them something like information, and to introduce something like rational practice in reference to obstetric medicine. Yours truly,

A. KEAN.

MOORSHEDABAD,
11*th October*, 1839.

Explanatory Note by DR. DUNCAN STEWART, *Superintendent General of Vaccination.*

Mr. Kean has very justly pointed out a blunder in the note which accompanied my Table, published in the April number of the Journal,

which certainly conveys to the reader the erroneous impression that all the 1328 cases of "childbed disease" were mothers.

I took the earliest opportunity in my power of rectifying the misapprehension which this gave rise to, as soon as it was pointed out to me, by addressing a brief note to the *Englishman* newspaper on the subject.

If you will do me the favor, in noticing Mr. Kean's letter, to refer him to the paragraph which I have marked in the accompanying printed copy of my Evidence before the Municipal Committee, and the annexed Table, he will perceive that the mistake has arisen from the careless omission of an explanation there given of the native term used to denote that class of diseases.

"The term employed to include all accidents of this nature, and ap-
"plied indiscriminately to the infant and the mother, (antari-rog) is
"one which attributes the fatal termination of such cases to demoniacal
"influence. It is not applied to casualties after the first month, and
"we may therefore conclude that the picture here given, distressing
"though it be, does not exhibit the total amount of suffering, and
"of death, caused by the barbarity, ignorance, and prejudices, of the
"Hindoos in their management of lying-in women. The number of
"still-born children is not given at all, nor is it, I fear, ascertainable.
"The picture is sufficiently frightful, which shows, as matter of fact,
"that of 1801 children who died during the first year of life, 1237 died
"from the accidents of childbed. Out of 88 mothers who lost their
"lives in childbed, four appear to have been so young as thirteen, two
"aged fourteen, six aged fifteen, and eight died between the ages of
"fifteen and twenty."

By reference to the annexed Table it will be seen that of the 1328 cases of "childbed" mortality, 1237 were infants under one year of age; and referring again to the Table in your April Journal it will be seen that most of these were not one month *ill*, and probably *not older*; 356 are stated to have died on the first day of illness; 308 on the second; 146 on the third, and so on. Neither the Table now sent nor the former has reference to the ratio of "mortality to population:" the imperfection of the census, which does not assign the ages of the *living* on any particular day, renders this impossible. The present Table exhibits merely the comparative prevalence and mortality of particular diseases, and the influence of these as affected by sex and age. The Table in the April Journal was drawn up from the same data, in order to discover the intensity of particular diseases, as evinced by their *duration*, before causing death.

Table of 20,000 *Hindoo deaths, showing the mortality by particular diseases, and at particular ages of both sexes.*

Ages.	Fevers.	Small-pox.	Dysentery.	Cholera.	Spleen & fever diseases.	Pulmonic diseases.	Cerebral and nervous diseases.	Constitutional diseases.	Accidents & anomalous.	Childbed diseases.	Total.		Total.	Per centage of ages.
											Males.	Females.		
1 year,	276	41	126	86	5	7	10	3	10	1,237	983	818	1,801	9·005
2 "	152	21	195	75	13	6	4	10	10	3	254	235	489	
3 "	167	26	197	78	13	1	8	13	6	0	274	235	509	
4 "	87	30	127	75	5	2	1	5	2	0	181	149	330	
5 "	113	32	101	72	6	1	6	4	12	0	224	126	350	7·38
6 "	61	21	75	56	7	5	4	2	2	0	141	92	233	
7 "	66	17	65	57	9	1	4	5	7	0	112	119	231	
8 "	47	16	63	46	6	2	1	2	2	0	91	94	185	
9 "	49	17	45	30	8	3	3	1	9	0	104	61	185	
10 "	65	15	70	53	10	5	4	5	2	0	141	88	229	5·315
11 "	54	13	21	34	8	0	4	2	3	0	88	55	139	
12 "	84	24	59	66	19	4	2	3	9	0	150	120	270	
13 "	39	11	13	36	12	4	3	2	3	4	79	48	127	
14 "	86	7	51	44	13	5	4	3	5	2	122	96	218	
15 "	67	14	32	58	8	7	8	5	4	6	129	80	209	4·815
20 "	624	65	392	466	57	79	20	33	31	8	1,131	645	1,776	8·88
30 "	1,123	81	770	1,293	51	197	42	42	25	37	2,672	998	3,670	18·25
40 "	899	17	742	896	21	148	18	62	64	26	1,995	898	2,893	14·65
50 "	559	8	605	600	19	107	19	36	31	2	1,326	661	1,987	9·935
60 "	463	2	577	308	10	67	21	46	43	3	970	570	1,540	7·7
70 "	228	4	365	153	6	42	9	34	14	0	463	392	855	4·225
80 "	256	4	627	137	5	74	34	26	13	0	511	665	1,176	5·88
90 "	75	2	230	36	0	18	4	13	0	0	148	230	378	1·89
100 "	32	0	173	16	0	7	0	4	2	0	62	178	240	1·2
Totals,..	5,672	488	5,733	4,773	311	792	233	361	309	1,328	12,347	7,653	20,000	100
Per centage of diseases.	28·36	1·22	28·665	23·865	1·555	3·96	1·165	1·805	1·545	6·64	61·735	38·265		

With the assistance of Captain Birch in 1837-38, the Statistical Committee of the Asiatic Society registered the births and deaths of natives in Calcutta, and the following results were obtained at the end of twelve months; viz. number of Births—2,781, whereof males 1,639, females 1,142. Of the mothers, 46 died in childbed; and during the same year the number of children under one year of age reported to have died, was 585, of whom 260 died during the first month of life. If we may suppose these children to be the same as those born in the same year and same place, the mortality is frightful, viz. 1 in every 5 for the year, or 1 in 10 for the first month.

Compare this with the statistical report of the Clinical Hospital of Midwifery in Berlin, published in a recent volume of the Lancet. In 2,656 labors, 1,913 children were born alive, whereof 92 died within the first month of existence, that is only 1 in 20.

The mortality among the mothers in the Berlin Hospital is not very different however from that in Calcutta; only 38 out of 2,656 died in childbed, in other words 1 in 67. If the Calcutta registers for 1837 are confirmed by farther observation, the mortality here is 1 in 60.

D. STEWART, M. D.

5th November, 1839.

ART. IV.—*On fifteen varieties of Fossil Shells found in the Saugor and Nerbudda territories.—By* GEORGE G. SPILSBURY, ESQ. *Surgeon, &c.**

Since the publication of my note on the discovery of the Fossil Shells near the Gour River, in the *Journal* for 1833, no notice has been sent of the children of that parent; and as I look upon myself now as a sort of Secretary for reporting Fossil discoveries of those more able, but not more willing than myself, I shall proceed to place on record a slight account of the localities from whence are derived the specimens I forwarded some months since.

On the arrival of Mr. Fraser, the Agent to the Governor General in these territories, in April last, that gentleman lost no time in making inquiries and sending out people in different directions; this led to the discovery of two other sites at no great distance from Suleya, viz.

* This valuable paper was forwarded to Mr. Jas. Prinsep, in March, 1838, but was accidentally mislaid. We are now very happy in presenting it to our readers, together with facsimiles of Captain Reynolds' excellent drawings; and additional notes lately received from Dr. Spilsbury on the same subject.—EDS. J. A. S.

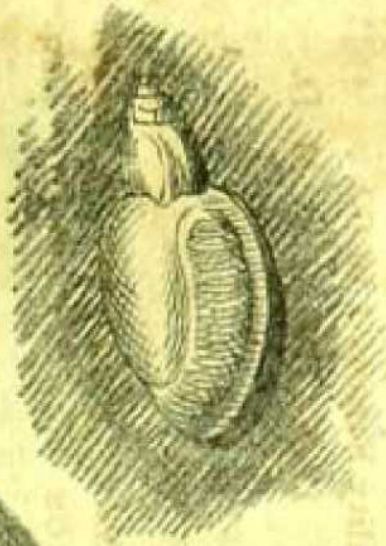
B. 12.

A. 11

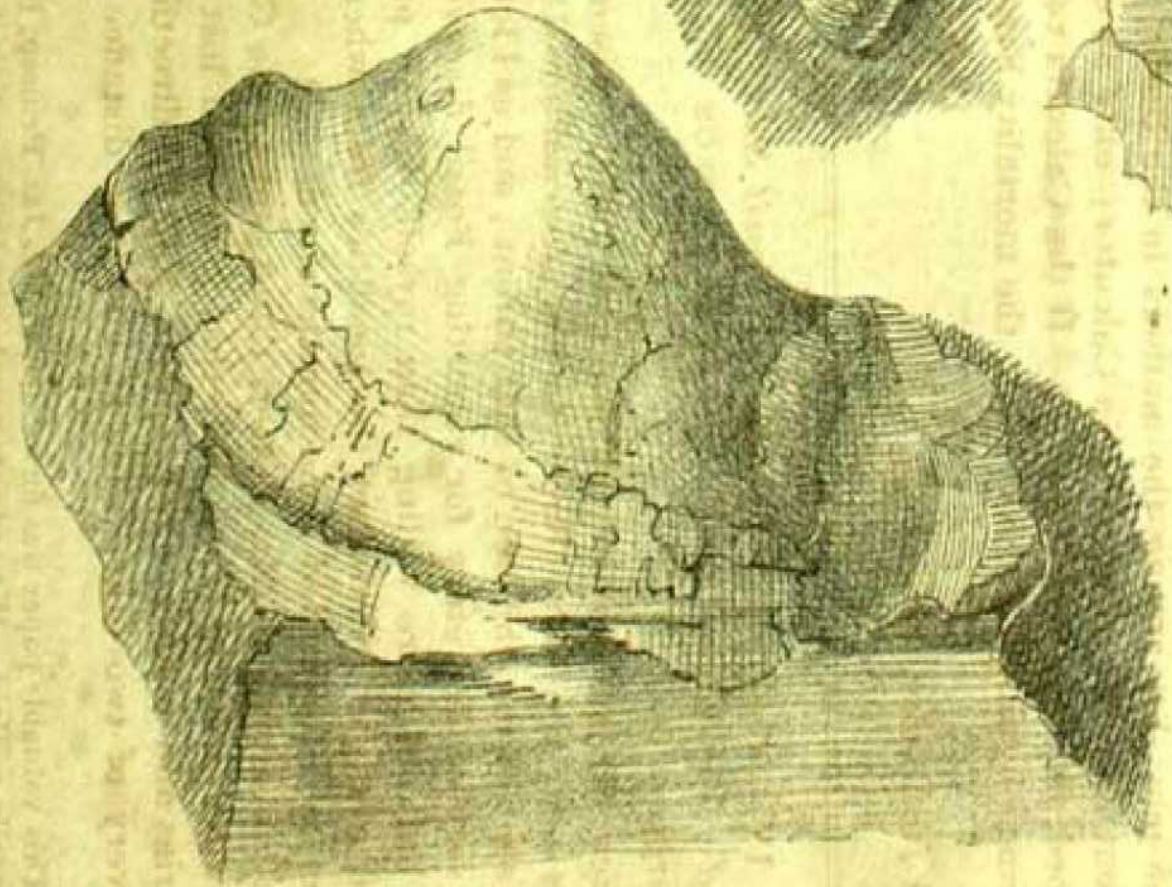
№ 1

C. 13

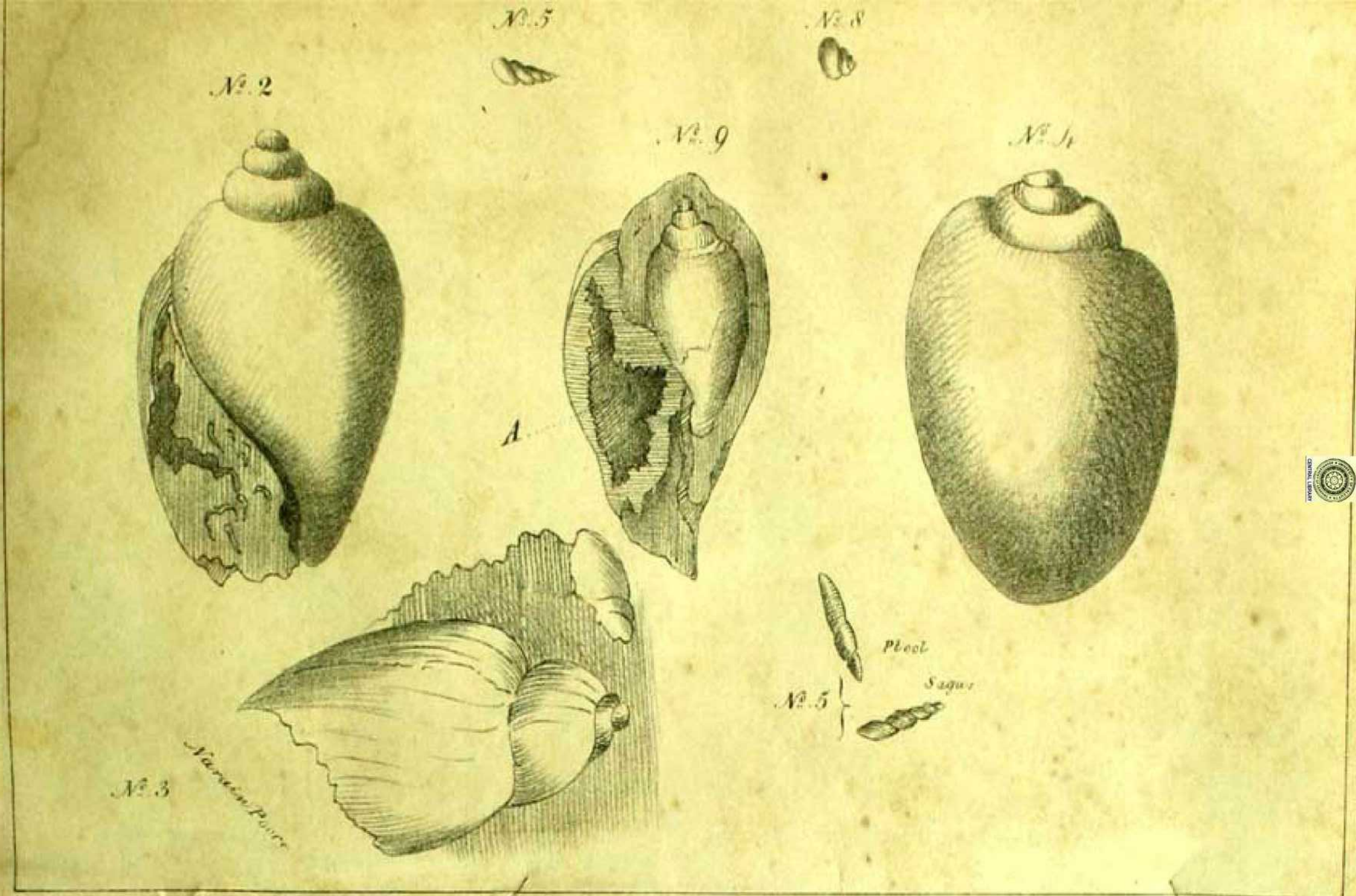








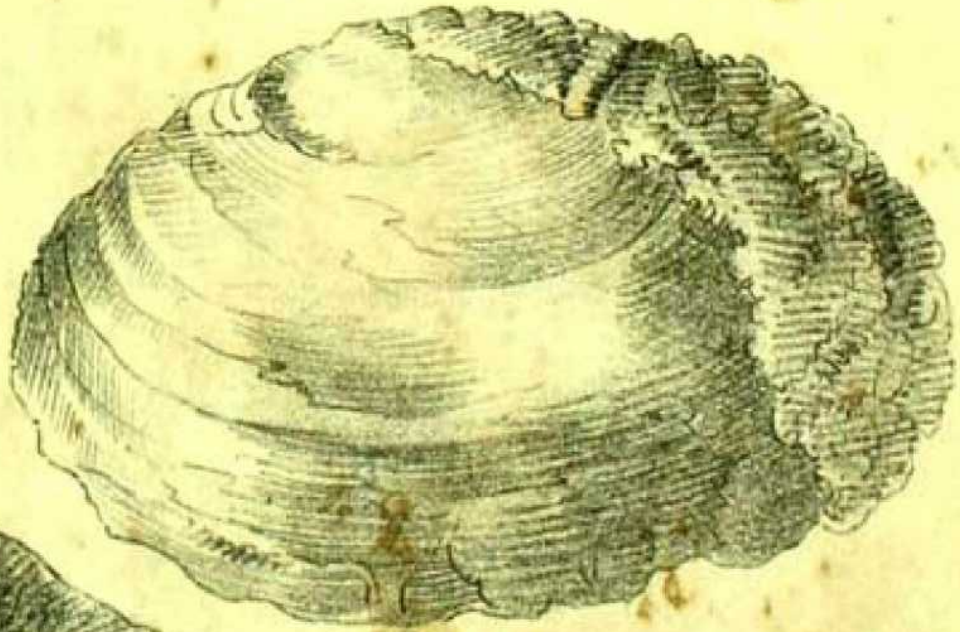
P. A. Reynolds _ del



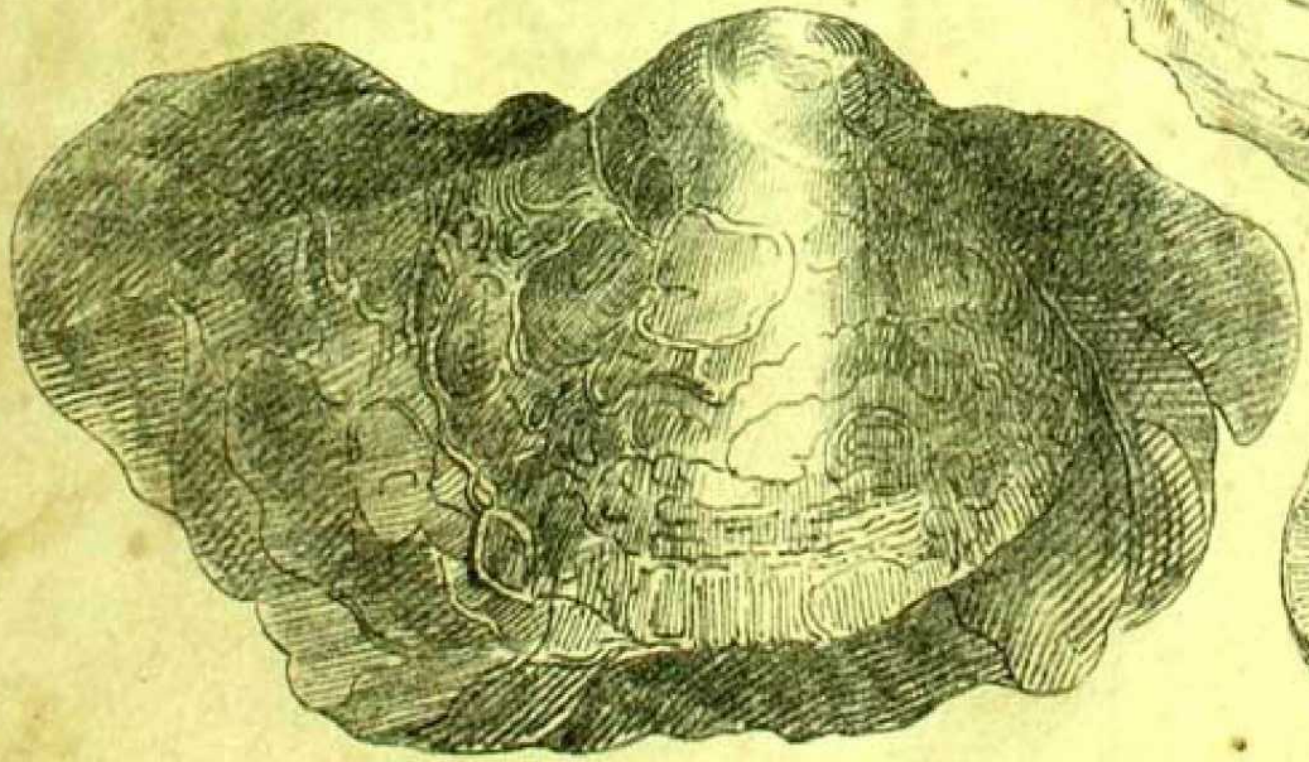
T. Black & Assoc. Lith. Brd. Calcutta

P.A. Reynolds del. et lith.

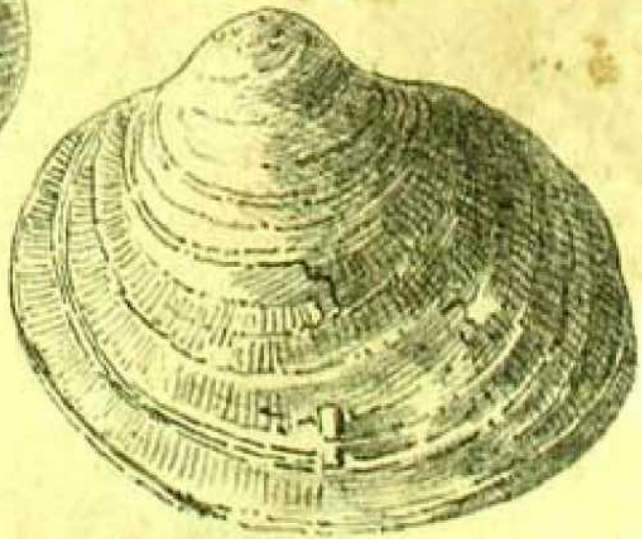
E. 15



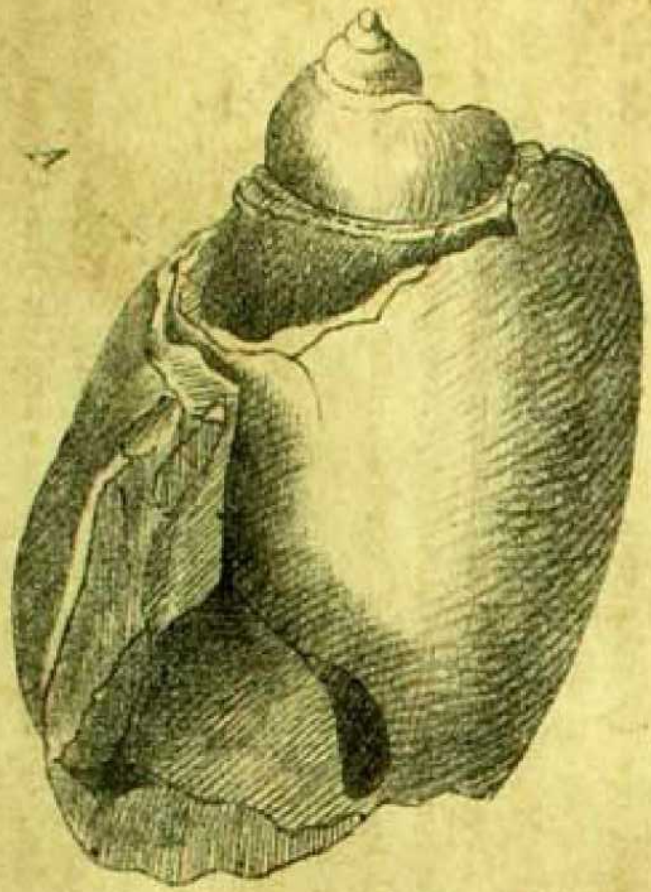
D. 14



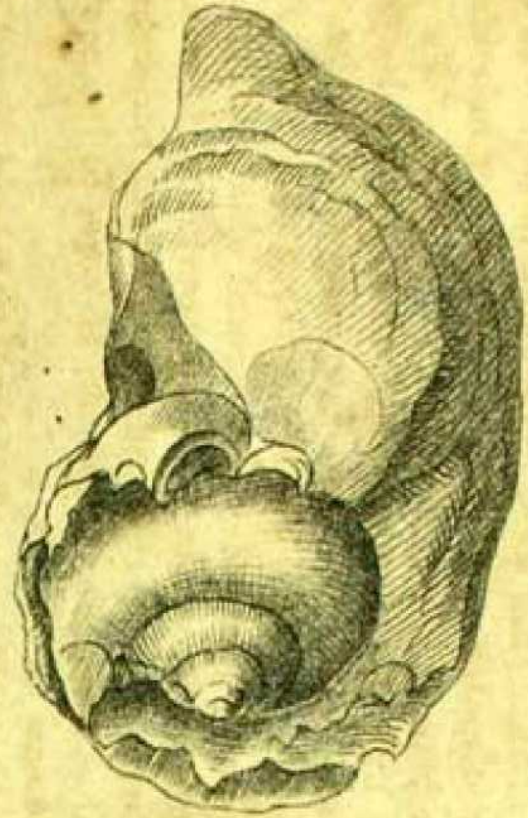
F. 16.



P. A. Reynolds _ del











Muudlup

Dhoonra and a village adjacent, only differing in colour from the first sent you, which were a reddish brown, and the others being white and of a more calcined appearance.

Some of these Shells being shewn to a native gentleman, he said, that he had heard similar ones were to be found in Scindea's country; and on Mr. Fraser dispatching a man to the quarter indicated, those labelled "Rae near Narwar" were brought in.

About this time I forwarded specimens to Major Ousley, who was then making the settlement of Betool, consequently surrounded by Putels of the district, and on his exhibiting the Shells, several of these country gentlemen came forward and informed him, that similar were to be found in several places about the neighbourhood of Betool. The principal sites are Sussoondra to the east; Bhurkawara, Bhyawara, Jaora to the south; Budoree, Kolgaon, Gaekham, Bakore, to the south-west; and Moorkha to the east of Mooltaye.

The next site ascertained was a bluish coloured Fossil Shell of calcedony brought from Narainpoor, situated in the Sobagpoor Pergunnah, north of the Nerbudda, and finally those sent in from Domadadur in the Ramgurh Raja's territory, south of the above river. For a knowledge of the two last sites we are indebted to the assiduity of Mr. Fraser in this most exciting pursuit.

I have also formerly sent specimens that were known to have come from near Mundla: our present circuit of the Agent to the Governor General, has enabled me to ascertain the site from whence they are derived; Phool Saugor, a village nine miles west of Mundla is the locality, in a nulla called by the cognosient Sunkh Deyra, and on a hill close by the Shell Breccia and Fossil wood were obtained. From this place the only Bivalves (four in number) have been procured; two of which I forwarded to the Asiatic Society, and the remainder are in Mr. Fraser's collection.

Accompanying this notice, I send natural sized drawings (for which I am indebted to my friend Captain P. A. Reynolds, of the Madras Army,) of all the varieties we have now discovered.

No. 1. Specimen of a Shell from Dhoonra.

2. From Phool Saugor, near Mundla. Those from Sussoondra, Gyekham, Bhurkawara, in the Betool district, are identically the same species.

3. From Narrainpoor, remarkable for the great breadth of the third whirl. Those from Rae Scindea's country and Domadadur in Ramgurh are similar.

4. From Moorkha, east of Mooltaye.

5. 5. 5. Three varieties found in the Breccia from Phool Saugor, near Mundla.

6. The only specimen of the kind from Sussoondra, east of Betool.

7. Shell (imbedded in Breccia of the same kind) from Jaora, south of Betool. This and the two next specimens are not reversed, as all the others are.

8. 8. Two specimens from Phool Saugor, near Mundla, identical with No. 7 from Betool district.

9. 9. Two drawings to shew how curiously one Shell is imbedded in the other. These are two very beautiful specimens, but the pencil cannot give any idea of the crystals at A A which add so much to their appearance.

10. Is delineated to give some notion of the very remarkable shape into which the shell has been compressed. Many brought in are almost flat, some have an indentation exactly corresponding to another Shell, but without any appearance of fracture or fissure, so that at the time of the convulsion it must have been in a plastic state.

So ends my notes on Fossil Shells, chiefly found in the Saugor and Nerbudda territories, for the discovery of which, after my geological friend the lime-burner, we are indebted to the zeal and activity of Messrs. Fraser, Ousley, and Ommauney.

The next communication will be on the dispatch of Fossils, that our late travels on the Nerbudda have produced; and for which you will be indebted to the above gentlemen, aided by their Secretary.

GEORGE G. SPILSBURY.

Camp, Source of the Nerbudda,
15th March, 1838.

---

*Supplementary Note on five additional varieties of Fossil Shells found in the Saugor and Nerbudda Territories.**

A. A drawing of a Shell totally unlike any of the others, and as yet only found at one site. Its great difference consists in the ribs or furrows so plainly shown in the specimen; this kind was found in March, 1838, on the 1st plateau of the

* Indeed the whole set, with exception of those from Rae, are so.

Mekul range of Hills, at the top of a steep trap ghat, on the high road from Sohagpoor to Umurkuntuk, near a village called Pureye;—the whole ground for some two miles was strewed with Shell Breccia.

B. This is a drawing of a Shell also found at the same site, and is not a reversed Shell. This, and the specimens No. 7 and 8. 8. found at Mundla, and also Betool, are the only Shells whose whirls are twined as those of the present day are.

C. D. Bivalves found at Phool Saugor and Mundla, and only a very few specimens have as yet been brought in. One similar was sent in from Mohtura Hill, (a branch I suspect of the Mekul Hills,) in the Ramgurh Rajah's country, where the Domadar ones are found.

E. Also a Bivalve, great numbers of which have lately been found in the Nerbudda near Jhansee Ghât, a fossil field which Mr. Fraser, the Agent of the Governor General, has brought to light, and of which I shall have more to say on forwarding some notes on fossils and sites from Hoshingabad to this.

F. Another Bivalve intermixed with E., but as yet only a few have been brought in.

On referring to the plates of the Himalayan Fossil Shells attached to the Rev. R. Everest's paper in the xviii. vol. of the Society's Transactions, the only Bivalve bearing any resemblance to those under notice is Fig. 13, Plate 1st. described as undetermined, which in general character has much the appearance of some found at Mundla, but ours are reversed. Plate 2nd. Bivalves, Fig. 26, b. the supposed Unis comes very near our F.—all the others are totally distinct.

The whole of the drawings are of the natural size, and I am indebted to the able pencil of Captain P. A. Reynolds, of the Madras Service, for their delineation.

JUBULPOOR,
11*th October*, 1839.

consists of stone-slabs and sugar mills from Chunar—saul wood from Gorukhpore, and grain of all kinds from the latter place and Bengal;—downwards are sent sugar, and the indigo of numerous factories about Jounpore.

I send for the Museum* some fragments of glazed earthenware, found on a slightly elevated spot in this neighbourhood. Forty years ago the place was covered with dense jungle, and large burr and peepul trees—sufficient grounds for believing the absence of human habitations for a very long period. The Hindoos have been denied the knowledge of the art of porcelain manufacture and glazing, and I am not aware of specimens like these having elsewhere been found. As a Hindoo can use earthen vessels but once, it is most probable that a Moosulman village once stood where these pieces are found, and very likely the art came with those for whose service such vessels would be employed. It is, however, strange that the art should have been lost, for I believe it is no where known to the natives. The fragments are of a coarse fabric and rude workmanship, but the glaze is good, and the colours very bright, considering the time they have been exposed—probably two or three hundred years;—the blue is very bright, and seems to have been the favourite colour—the designs are not very elegant, and evidently neither Chinese nor imitations of it.

Agates and pebbles, cut and uncut, are also found, having been used I imagine in the composition of the glaze; or it may be for beads only, numbers of which are picked up. They must have been brought from a distance, as no stream producing them is to be seen on this side the Ganges, the nearest hills being opposite Benares. Could the common clay now used have been employed for the body of the ware? I fancy not, for it vitrifies and swells at a low heat, losing its shape, and adhering to whatever it touches. It is a great pity the art is lost.

V. T.

* Many will doubtless laugh to see them there. I was surprised, when a boy, to see in the British Museum pieces of broken glass vessels, neither handsome nor well made; but it was explained to me, that such things were valuable as specimens of the manufacture in its early days, and not according to their price as mere glass.

ART. VI.—*Memoranda relative to experiments on the communication of Telegraphic Signals by induced Electricity.*—*By* W. B. O'SHAUGHNESSY, M. D. *Assistant Surgeon; Professor of Chemistry, Medical College, Calcutta; and Officiating Joint-Secretary to the Asiatic Society of Bengal.*

There are few projects which at first sight appear so visionary as those which promise practical benefit to mankind through the agency of electrical operations. From the dawning of knowledge in this science, pretenders of every grade have found it a free field for their speculations: and hence perhaps it arises that the sober and practical part of society generally regard with distrust, the multitudes of projects which electricians are constantly advancing.

We nevertheless find that many eminent philosophers—whose habits of cautious research, have been proved by their numerous contributions to the mass of general science—such men as Brande, Faraday, Wheatstone, and Fox—are amongst the foremost, who predict many real advantages to the community from the application of the mysterious, though readily controllable forces which electricity places at our command.

I am aware that I am less entitled than many others to have my inferences from electrical data attended to with confidence, having at least on one occasion fallen into the error of indulging prematurely in dreams of useful results, and of reasoning unguardedly from the model to the machine. Still I believe that the experiments detailed in this paper, will be found to admit fairly of the consequences to which they seem to me to lead. They appear to me conclusive as to the perfect practicability of establishing, at a cheap rate, telegraphical communications, acting through electrical agencies, certain and infallible in their indications, perceptible alike by night and day, in all varieties of weather and season, and, lastly, so swift in their nature, that the greatest distances concerned bear scarcely any appreciable proportion to the inconceivably brief period in which the signal can be conveyed.

I was induced to institute the experiments detailed in this paper, by the statements I had read in several periodicals regarding similar attempts in England and the continents of Europe and America, and the actual patenting and adoption by the directors of the London and Birmingham railway of a similar plan by Professor Wheatstone, of the King's College, London.

Before entering into details regarding my experiments, which were carried on in the Botanical Gardens of Calcutta, during May of this

year, it will perhaps prove interesting to give a rapid historical outline of the attempts which have been made to apply the various indications of the electrical fluid as the medium of instantaneous communication between distant places. For several of the following references I am indebted to an article by Dr. Steinheils of Munich, translated in the May number of Sturgeon's Annals of Electricity.

Historical Notice.

1.—*Telegraphs by common electricity.*

The first electrical telegraph on record was proposed by Winkler of Leipzic, in 1746. He employed a Leyden jar which was discharged through a single wire, a reach of the river Pleiss being included in the circuit. Le Monnier afterwards made a similar experiment in Paris, using a wire 12,789 feet long. In 1798, Betancourt laid a wire between Madrid and Aranjuez, 26 miles distant, to serve for the transmission of shocks by the Leyden phial. The pith ball electrometer was used by Lomand; and the sparks from tin-foil on glass surfaces by Reiser about the same period.

In 1826, Francis Ronalds, of Hammersmith, published a description of a plan in which two clocks were employed, one at each terminal station. Each clock had a moveable dial with twenty signals on its circumference. As the required signal letter presented itself, a spark passed at each station by the discharge of a Leyden phial. This plan, though comprising, as I will point out in the sequel, the true principle of a good system, was found useless in practice, as each sign was given but once in each revolution.

Such are the principal attempts hitherto made to effect the object in view, by means of frictional electricity. At the Meeting of the Asiatic Society of Bengal, of June 1839, M. Adolphe Bazin presented a project for effecting telegraphic correspondence by means of thirty insulated conductors passing between the terminal stations, each conductor representing a letter or number, so that by the rapid succession of sparks correspondence could be effectually carried on. With this M. Bazin connected an hydraulic apparatus for the conveyance of intelligence across rivers, and in other situations where frictional electricity might not be suitable.

M. Bazin's plans, although very ingenious, were altogether impracticable, and as we shall afterwards establish, demanded thirty conductors, where only one is actually requisite; moreover the impediments to the use of common electricity are absolutely insuperable in all countries (Bengal for example) visited by periodical rains or inundations.

M. Bazin indeed admitted this freely, when he found that not one of the electrical machines I placed at his disposal could by ordinary manipulation be made to evolve the least sign of excitement. But even effecting the excitement, which I have done by enclosing the machines within a glass case hermetically sealed, and supplied with air artificially dried, still it is impossible so to insulate the *external* conductors, as to prevent the dispersion of the excitement outside the apparatus.

---

§ 2.—*Telegraphs by Chemical decomposition.*

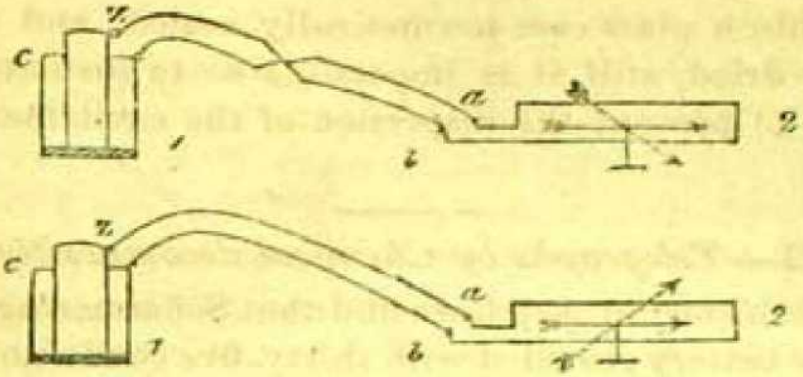
In Steinheils' historical sketch we find that Soëmmering, in 1807, employed a voltaic battery provided with thirty-five conductors, each terminating in a gold pin set in a tube; on completing the connexions the water is decomposed and the ascent of bubbles of gas indicates the signal. This system is, however, only available for very short distances, as the decomposing power of the termination of any pair of conductors, the diameter being the same, diminishes rapidly by lengthening the wire. The law of the diminution, Ritchie has attempted to establish, but his experiments are not considered to be conclusive; its rapidity may be shewn by an experiment I performed in 1839. A voltaic battery, the conductors of which were *six* feet long, decomposed water to the rate of forty cubic inches of oxygen and hydrogen gases in three minutes. Conductors of the same diameter, but *thirty-six* feet long were next employed; the battery then only evolved twenty-five cubic inches of the gases; with wires of 200 feet only eleven inches were obtained; still the battery was constant in its action, for with the original conductors at the close of the experiments it still gave forty cubic inches. Again in the experiments at the Botanical Garden in 1839, no chemical decomposition—even of the most yielding of all compounds, the ioduret of potassium—could be performed at the termination of one and a half miles, whereas other manifestations of electrical action were readily procurable at the termination of twenty-one miles of wires.

---

§ 3.—*Telegraphs by volta-magnetic deflection.*

The next method employed is the deflection of the magnetic needle by voltaic or magnetic electricity. I may remind the general reader that whenever electrical vibrations occur in exceedingly rapid intervals in an insulated wire surrounding and in the same direction with a balanced magnetic needle, the needle is deflected, either east or west according to the order in which the ends of the surrounding coil are

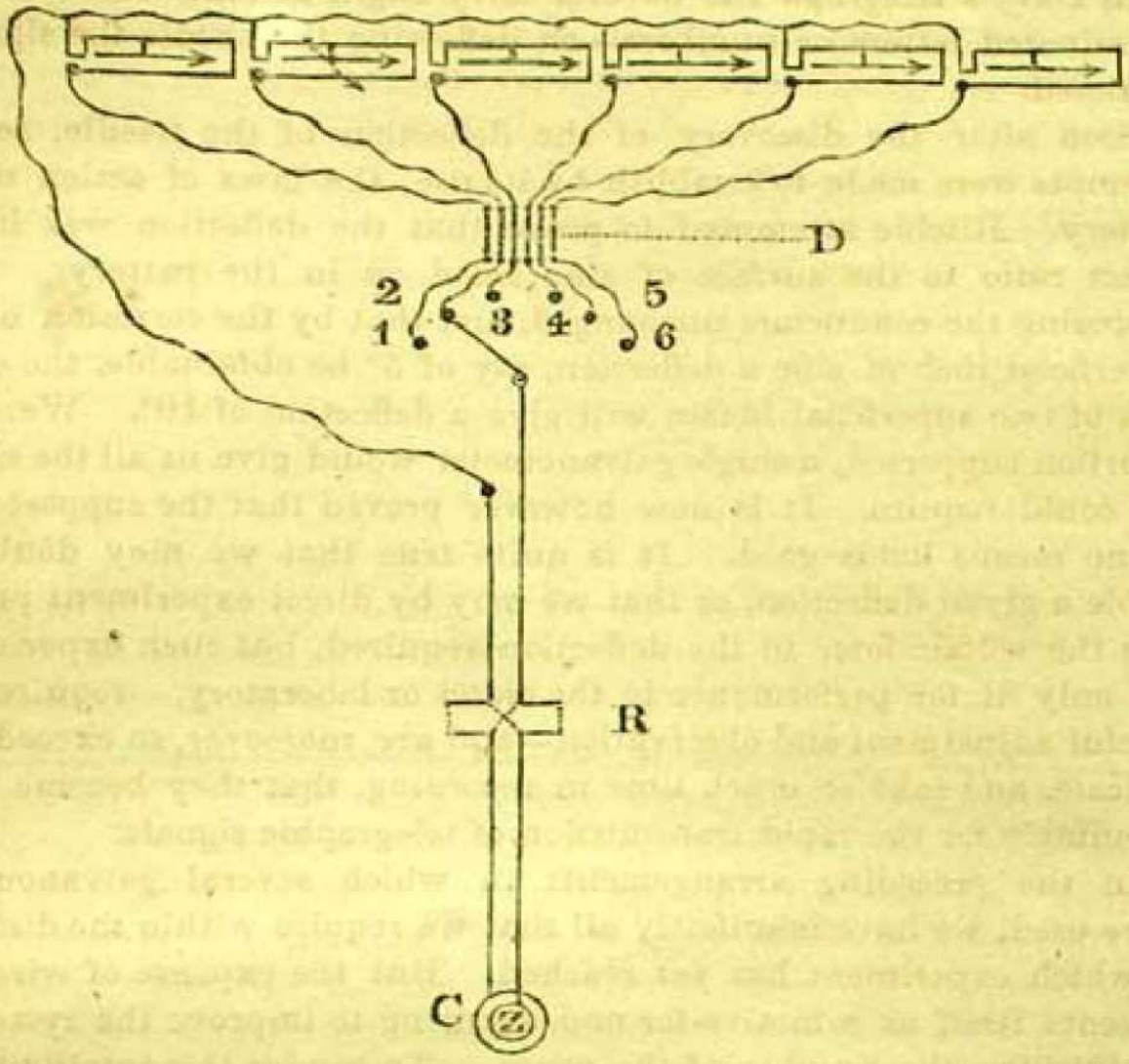
connected with the source of electrical excitement. As I am now writing for popular readers I may be pardoned by the adept for illustrating this interesting fact by an explanatory diagram.



In this diagram, 1 represents the voltaic couple; z zinc; and c copper; 2 shews the magnetic needle on its stand in the magnetic meridian, with the surrounding coil of wire, with its terminations a and b. In the first the wires cross, or that from z proceeds to b, that from c to a, and the deflection accordingly is from north to west. In the second the wire from z proceeds to a, that from c to b, and deflection of the needle is from north to east.

Thus with two wires we can obtain two signals only, but one wire may belong, or be common to any number of galvanometers, so that from three wires we can obtain four signals; from four wires six signals; from five wires eight signals; from six wires ten signals; eight wires fourteen signals; ten wires eighteen signals; twelve wires twenty-two signals; fourteen wires twenty-six signals, or the alphabet.

In the following diagram six galvanometers are represented connected with seven wires, one being common to all. The six wires run any distance in a bundle, and are best insulated by silk or resin from each other. The ends of the wires then proceed to little cisterns of mercury, disposed in a circle. From the centre of the circle a moveable wire proceeds as a radius, which may be moved to any of the cisterns 1, 2, 3, 4, 5, 6. To this centre proceeds one of the poles (z) of the voltaic couple—and to the termination of the common wire, proceeds the second pole of the couple c.



In the diagram the connexion is made with No. 2, and the dotted line shews the deflection of the needle—and this deflection may be reversed by crossing the course of the battery wires, as shewn at R. The five parallel lines at D shew the conductors, which may be indefinitely prolonged.

Thus by a move of the *radius wire* to any of the cisterns we can deflect the needle at the corresponding galvanometer; and by a move of the cross wires we can reverse the deflection at our pleasure.

We have here a combination which affords sufficient numbers for spelling, numbering, dictionary and cypher signals. Even four galvanometers which can be worked by five wires, will afford the necessary combinations for every description of signals.*

* This telegraph has been actually laid down between London and Drayton, and is to be carried on to Bristol. Though extremely ingenious, I shall presently prove that the railway itself without any special conductors, or at most with one wire, is a perfect telegraphic line.

In Davy's telegraph the needles carry slight screens which conceal illuminated letters or numbers—on deflecting the needle the signal is disclosed.

Soon after the discovery of the deflection of the needle, several attempts were made to establish by its use, the laws of action of the battery. Ritchie attempted to prove that the deflection was in the direct ratio to the surface of zinc acted on in the battery. Thus supposing the conductors unchanged, and that by the corrosion of one superficial inch of zinc a deflection, say of 5° be obtainable, the corrosion of two superficial inches will give a deflection of 10°. Were this assertion supported, a single galvanometer would give us all the signals we could require. It is now however proved that the supposed law by no means holds good. It is quite true that we may double or treble a given deflection, or that we may by direct experiment proportion the voltaic force to the deflection required, but such experiments are only fit for performance in the closet or laboratory,—require such careful adjustment and observation—and are, moreover, so exceedingly delicate, and take so much time in recording, that they become quite unsuitable for the rapid transmission of telegraphic signals.

In the preceding arrangements in which several galvanometers were used, we have manifestly all that we require within the distances to which experiment has yet reached. But the expense of wire next presents itself as a motive for endeavouring to improve the system by diminishing the number of the wires. To render this intelligible, of the copper bell wire best suited for these experiments, each mile costs 276 rupees.

Steinheils of Munich, the most recent writer on this subject, proposes either of two very ingenious methods. The first is causing the galvanometrical needle to terminate in a fountain pen, the tip of which touches and marks a strip of paper revolving by clockwork ;—according to the number of dots a letter or numerical signal can be obtained. The second plan is the employment of the tip of the needle to strike a bell, when the number of strokes in a given time afford the requisite signal.

The galvanometer moreover has been rendered so exceedingly delicate in its indications, that very feeble electrical forces will succeed in producing deflections. The electricity evolved by holding up the hand before a disk composed of bismuth and antimony, caused in an instrument contrived by Dr. Page, of Baltimore, a deviation of fifty degrees. In a galvanometer in my possession, constructed by Messrs. Watkins and Hill, the action of a drop of acidulated water on a zinc wire the size of a pin, and opposed to a copper element of equal size, urges the needle through a quarter of a circle. Moreover the differen-

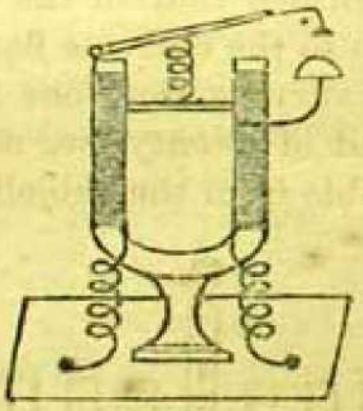
tial principle so successfully applied by Häuy to the discovery of magnetism in minerals containing traces of iron, can be had recourse to here so as to enhance still further the delicacy of these beautiful instruments.

Having thus sufficiently exposed the construction and mode of action of the galvanometer, I must reserve for another place, the results of my experiments in testing the value of the different methods described.

§ 4.—*Henry's Magnetic Telegraph.*

I have still however to notice another proposal which has attracted great attention, and is said, on good authority, to be in course of practical application in the United States.

Professor Henry proposes to employ the sudden development of magnetism, occasioned in a horse shoe bar of soft iron while surrounded by a spiral of insulated wire, the extremities of which are in contact with a voltaic couple. The magnet thus created attracts a light piece of iron which carries an arm. The arm when attracted marks dots on a revolving cylinder, or may strike a bell. The arrangement is shewn in the following figure. The spiral wire in the centre is a spring to lift up the arm on the cessation of each stroke.

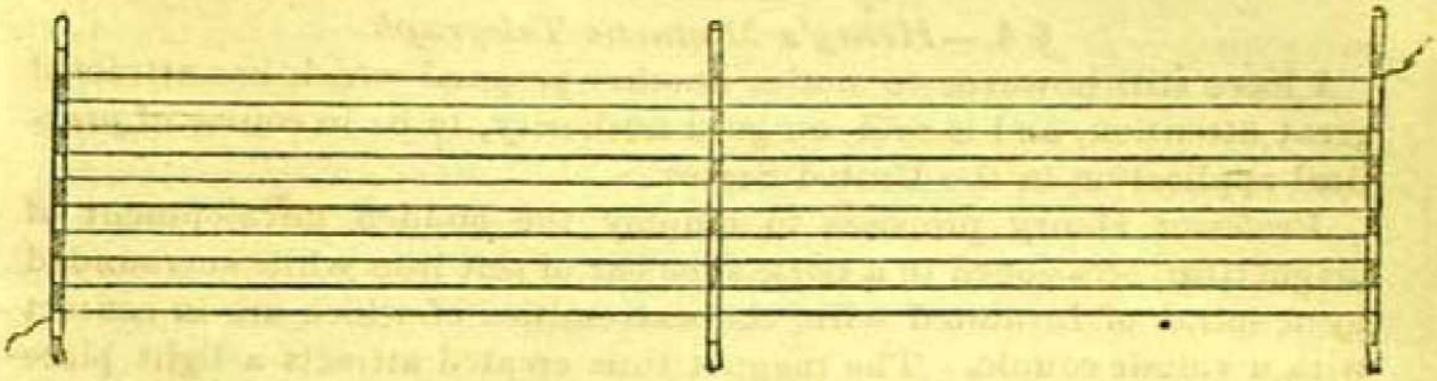


Eleven miles of wire were employed in one of Henry's experiments, but the wire was coiled spirally round a drum, a circumstance which considerably invalidates the results. This will seem sufficiently intelligible by reference to the construction of the "coil electro-magnetic machine," described in a subsequent page.

§ 5.—*Experiments by the Author.*

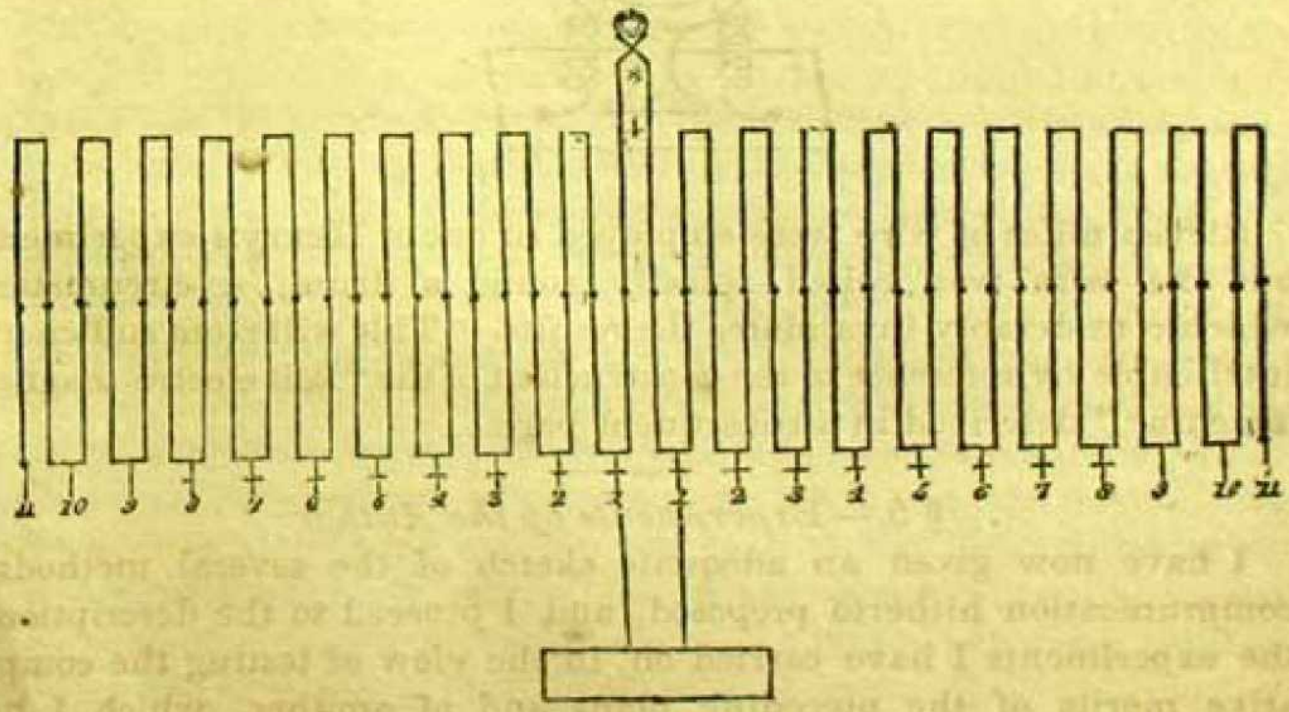
I have now given an adequate sketch of the several methods of communication hitherto proposed, and I proceed to the description of the experiments I have carried on, in the view of testing the comparative merits of the preceding plans and of another, which I have myself devised.

My first object was to construct a line of wires of sufficient length to afford practically valuable results. With Dr. Wallich's liberal aid a parallelogram of ground, 450 feet long by 240 in breadth, was planted with forty-two lines of bamboos. Each line was formed of three bamboos firmly driven into the ground, fifteen feet in height. Each row was disposed so as to receive half a mile of wire in one continuous line, thus,*



The strands of wire were one foot apart from each other. As each row was laid down, it was carefully coated with tar varnish.

A tent was pitched in front of the entire line, and the connections of the wires were so established that in the course of half an hour it could be tested from centre to the extreme flank, so as to ascertain the effects of lengths of wire, varying from one to eleven miles at either side, forming a total circuit of twenty-two miles. This may be perhaps more readily intelligible from the subjoined figure.



* Eleven lines should have been shewn in this drawing.

The cross lines above the numbers exhibit the wires led from each half mile of conductor. Thus by cutting through 1. 1. the next numbers to right and left became the conductors or nearest electrodes, and the length of the circuit thus rose from one to three miles; cutting 2. 2. will make 3. 3. the electrodes, and increase the circuit to five miles, and so on, each section added a mile to the circuit at either side.

The wires employed were of iron (annealed), diameter one-twelfth of an inch. It is almost needless to observe that iron was used not from choice but necessity. A sufficient quantity of copper wire was not procurable in Calcutta, no draw-bench was ready to manufacture the necessary supply, moreover the rainy season was fast approaching when such experiments could scarcely be attempted, constant exposure in the open air being essentially requisite to success. The expense again of copper would have amounted to much more than a private individual could afford.

With iron wire however I considered that the results would be still of much practical value. Being the *worst* of the metallic conductors of electricity, it seemed a reasonable inference that whatever might be found practicable with iron, would *à fortiori* be so with the copper, or best conductor.

On the completion of the line the following instruments were tried.

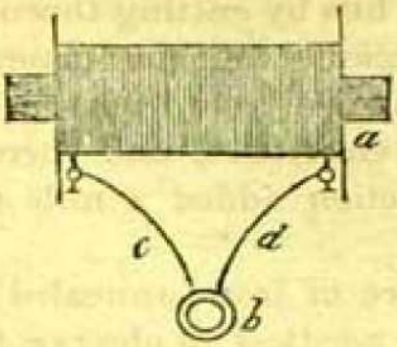
1st. An electro-magnet of soft iron, $1\frac{1}{2}$ inch in diameter, poles 1 inch apart, length from centre to poles 12 inches, weight 14 lbs. surrounded by one hundred yards of insulated copper wire, the twelfth of an inch in diameter. This electro-magnet, when excited by the voltaic battery used in the subsequent experiments, with conductors seven feet in length, supported 240lbs.

2nd. An electro-magnet of very small size, constructed by Watkins, of London, capable of supporting 30lbs. with the battery now referred to, and with the same length of conductors.

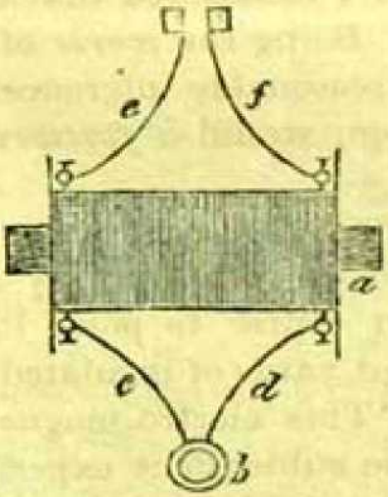
3rd. An astatic galvanometer by Watkins and Hill, already referred to.

4th. An electro-magnetic induction machine, also by Watkins, of which a brief description is desirable.

This instrument consists of a coil of thick wires insulated by silk, and wound spirally round a wooden cylinder having a hollow axis one inch in diameter. The ends of this coil are connected with metallic screws, so that they can be joined to the poles of a voltaic battery.



Around this primary coil is wound a second coil of extremely thin wire, also insulated and 1000 yards long, totally unconnected, though in close juxtaposition with the primary coil, the ends of the wire being led to screws to which handles, directors, &c., can be attached, thus,



Into the hollow axis at *a* is introduced a bundle of insulated iron wires.

The action of the instrument may be very briefly described. While the battery at *b* is in contact with the wires *c d* the primary coil is excited. By interrupting the circuit at + or elsewhere, at the instant of its interruption, the secondary or external coil becomes excited by induction or proximity—and this excitement is augmented by the influence of the magnetism simultaneously annihilated in the central bundle of iron wire.

The electrical state thus momentarily generated in the secondary wires, may be rendered evident by the production of a spark and shock, by effecting chemical decomposition and all the other signs of electrical action, at the terminations of the secondary coil *e*, *f*.

In this cursory description I confine myself to facts alone, and refrain from entering on any theoretical speculation as to the causes of these singular and deeply interesting phenomena.

Experiments with the Electro-magnet No. 1.

The day being fine, the ground and bamboos perfectly dry, at 9. A. M. the sustaining power of the electro-magnet No. 1. was tested with iron conducting wires ten feet long, and found to amount to 46 lbs.

With one mile of same wire, ½ mile at each side,

	it supported, ...	18 lbs.
2	Miles of wire, ...	8 lbs. with difficulty.
3	Miles of wire, ...	2½ lbs.
4	Miles of wire, ...	23 ounces, with difficulty.
4½	Miles, ...	sustaining force ceased altogether.

Electro-magnet No. 2.

With 10 feet wire, ...		12 lbs.
—— 1	Mile, ...	7 lbs.
—— 2	Miles, ...	3 lbs.
—— 3	Miles, ...	0½ lb.
—— 4	Miles, ...	no sustaining power.

Assuming iron to be inferior to copper in about the proportion of 1 to 7, according to Sir Humphry Davy and Becquerel's standard of conductors, this experiment shews that for equal diameters of wire, copper would convey the signal by Henry's method to about twenty-one miles in an imperceptible period of time. This distance might be extended by enlarging the diameter of the wires, but to what limit, is as yet unknown.

Experiments with Galvanometer.

The astatic galvanometer was arranged and levelled with much care, the needles retaining a very slight degree of directive force so as to cause them to swing in the magnetic meridian.

At 1	Mile, deviation maximum or	90°

The needles being restrained by pins at the quadrant:—

At 2	Miles.	90°
— 3	Miles.	75°
— 4	Miles.	63°
— 6	Miles.	40°
— 10	Miles.	11°
— 11½	Miles at each side to total circuit 23 miles.	barely perceptible.

Up to the sixth mile the needles were deflected with great rapidity on the connexion being made with the voltaic element. The reversal of the order of connection also satisfactorily reversed the needle from east to west, and the contrary. But when the deflection fell to below 40°, the movements were exceedingly sluggish, so that on an average two seconds elapsed before each signal could be read off. The change of battery poles then often failed in reversing the direction of the needles—and here, as before, at least two seconds were consumed in each movement. Applying the same rule to this as to the preceding experiment, the galvanometer would convey signals by a copper wire to a distance of twenty-eight miles—and this might be increased by enlarging the wire or the battery, or by adding to the delicacy of the galvanometer —but in one essential point this system was deficient, namely, in rapidity of movement. Two seconds or even *one*, on each telegraphic movement, would be an extravagant waste of time compared with the celerity with which signals can be conveyed by another method.

Chemical decomposition.

One of the most delicate of all tests of voltaic electrical action is the decomposition of ioduret of potassium and the production of a blue colour which the free iodine strikes with starch. This effect was produced in my experiments for a line of three miles of wire. Beyond this no decomposition could be effected. From this fact we are entitled to infer the impracticability of Soëmmering's method. See § 2.

Induction machine, and mode of correspondence by Pulsations and Chronometers.

The battery was connected with the primary coil see fig. 1. p. 723. by very short wires;—the ends of the secondary coil wires screwed to the right and left wires of the great parallelogram. P. 721.

On breaking contact with the primary coil, a shock utterly intolerable passed at half a mile to an individual holding the metallic handles in which the wires ended.

To avoid fatiguing details I may at once state, that by this secondary coil, excited by but three small voltaic couples, the shocks up to seven miles were exceedingly smart—at eleven and a half at each side, they amounted to no more than strong, but not disagreeable, sensations. I think these might be best termed "pulsations," for to the *hand* they impart the same feeling proportionately, that a strong and full pulse does to the *finger*.

Each pulsation is practically simultaneous with the breaking of contact with the battery. To give a rude idea of the velocity of the signal, the contact being broken by a clicking wheel, on a perfectly calm morning, at a distance of but sixty yards, the pulsation was invariably felt at a sensible interval before the click which preceded it was heard. Thus sound travelling at the rate of 1090 feet in one second=to 121 feet in one-ninth of a second, the electrical impulse passes through a total circuit of twenty-two miles, in less than that practically insignificant fraction of time. This however conveys but an erroneous notion of the almost inconceivable velocity of the impulse. Professor Wheatstone has proved that the electrical accumulation of the Leyden phial is discharged and circulates through copper conductors, one fifteenth of an inch in diameter, with greater velocity than the progress of light through the planetary spaces, and in the rate at least of 288,000 miles in a second. Now the discharges of the Leyden bottle and those of induced coil electricity are in the closest circumstances analogous to each other.

Of the pulsations thus transmitted, it is perfectly easy to count six in one second—thus with a little practice any signal number can be made from one to six in one second.

Besides the simple repetition of the pulsations up to nine, beyond which they become indistinct for each signal, there are at least two modes of conveying other sensations by this apparatus. If the connexion between the battery of the primary coil be made and broken by a ratchet-wheel of brass and silver, and the wheel be turned pretty rapidly, a sensation analogous to the ruffle of a drum is so distinct as to render mistake impossible. A third set is obtained by interposing a flat file in the battery circuit, and interrupting this by drawing one wire along the surface of the file; here instead of the ruffle, the feeling is that of a blunt saw drawn lightly across the palms of the observer's hands. It is difficult to express in words the differences in these distinguishing signals, but the practice of a quarter of an hour will make the observer so familiar with them, that he can without the slightest difficulty carry on a communication by numbering or spelling with his distant correspondent. With a tithe of the practice of a pianist or harpist, the most perfect sympathy is practicable between the signalists, and that as fast as the signal can be spelt. In short, with but little less velocity than the articulations of language or the writing of stenographic characters, this silent, but thoroughly intelligible, and still most secret of all correspondence can take place.

It is almost unnecessary for me to remind the reader of the admitted

fact, that the exquisite delicacy of the impressions of the touch transcends, in some respects, the evidence of all the other senses. The eye and ear are liable to distraction by casual sounds or phenomena, while the attentive touch knows no interruption. The eye must close momentarily and thus lose the observance of many rapid phenomena. Dazzled by too vivid lights, and confused by too constant watching, vision soon ceases to be accurate, while the frequent repetition of similar sounds either becomes absolute silence to the ear, or like the murmuring of a rivulet or the humming of insects, gradually narcotizes the observer. Let the experimentalist attempt to count but 200 rapid strokes of a faint bell, and he will at once acknowledge the imperfections of any acoustic method.

Thus with copper conductors equal in diameter to the iron wires I employed, signals by pulsation are proved to be communicable by the method above described, in less than any appreciable period of time, to the distance of 154 miles.

Besides the method of telegraphing by pulsations and other signals recognized by touch alone, there is another of which I have made extensive trial, and which is capable of affording still more accurate and intelligible and equally rapid results.

Without any knowledge of the experiments quoted by Steinheils—many months indeed before the paper by that author was published in England—I attempted, and with success, to effect the transmission of signals by using time-keepers at each terminus, and causing the pulsation to be felt as the hands simultaneously passed a certain number or letter on the dial.

In these experiments I first employed a pair of watches modified for my use by that ingenious artist Mr. Grant, of this city. All the movements were taken out but those connected with the second-hand, and a long lever was so constructed as to check the balance-wheel at pleasure during the recoil. Round the second-hand was placed a card dial laid off with three concentric circles divided each into twenty parts. Omitting vowels and superfluous letters, the alphabet was laid down in each circle so that the hand would during each revolution point to any letter three times; the compartments were moreover numbered on the same principle, so that each figure from one to ten would be pointed to six times in a revolution.

The hand is passing each compartment during three seconds. The observer receives say two pulsations, and is thereby referred to the second circle, and reads the letter or cypher, according as the signal be for spelling or numbering.

Although the watches were of the very cheapest kind, and would not keep time together for more than five minutes, still they were quite sufficient to enable a correspondence to be carried on. Thus a signal seldom lasted longer than three minutes; both watches were then allowed to run to No. 1 or zero, and stopped. To renew correspondence a prolonged roll was communicated. If but one roll, it indicated spelling; if two, numbering. On the roll ceasing, three pulsations at intervals of one second were passed, and at the third the correspondents started their watches.

The pendulum was also tried, and with decided advantage. Two German clocks sufficed to demonstrate the practicability of the system. The striking parts were removed, and also the hour and minute hands and dial.—To the axis of the escapement wheel a needle was attached, carrying a light hand which indicated on a dial the signals above described. The German clocks (which cost but 16 rupees the pair,) in numerous experiments beat together for several hours, and could always be relied on for one hour at least. It is almost needless to add, that by shortening or lengthening the pendulum the rate was readily varied from 40 to 80 seconds for each revolution.

I did not omit chronometers, although I could not of course so alter these costly instruments as to adjust them perfectly to my experiments. It is obvious however that chronometers will on my method give an unerring and constant mode of telegraphic correspondence. In a recent trial at Greenwich the mean error of several instruments in one year was but two seconds!* Here then are two movers constantly and simultaneously pointing to one and the same signal, be it letter, figure, or cypher. The electric pulsations which "take no note of time" or distance, supply us with the means of converting this synchronism to the unexpected and invaluable end to which it is now proposed to be applied.

Even employing inferior chronometers, the addition of a moveable dial which could be adjusted daily on a method too simple to need description, would secure the perfection of the correspondence; or the daily difference of the instruments being known, a tabular correction could we made; or, lastly, by an occasional astronomical observation of true time at each station, the object in view could be as certainly obtained.

* In 1831, the first three prize chronometers only differed $\frac{19}{100}$ of a second in one year.

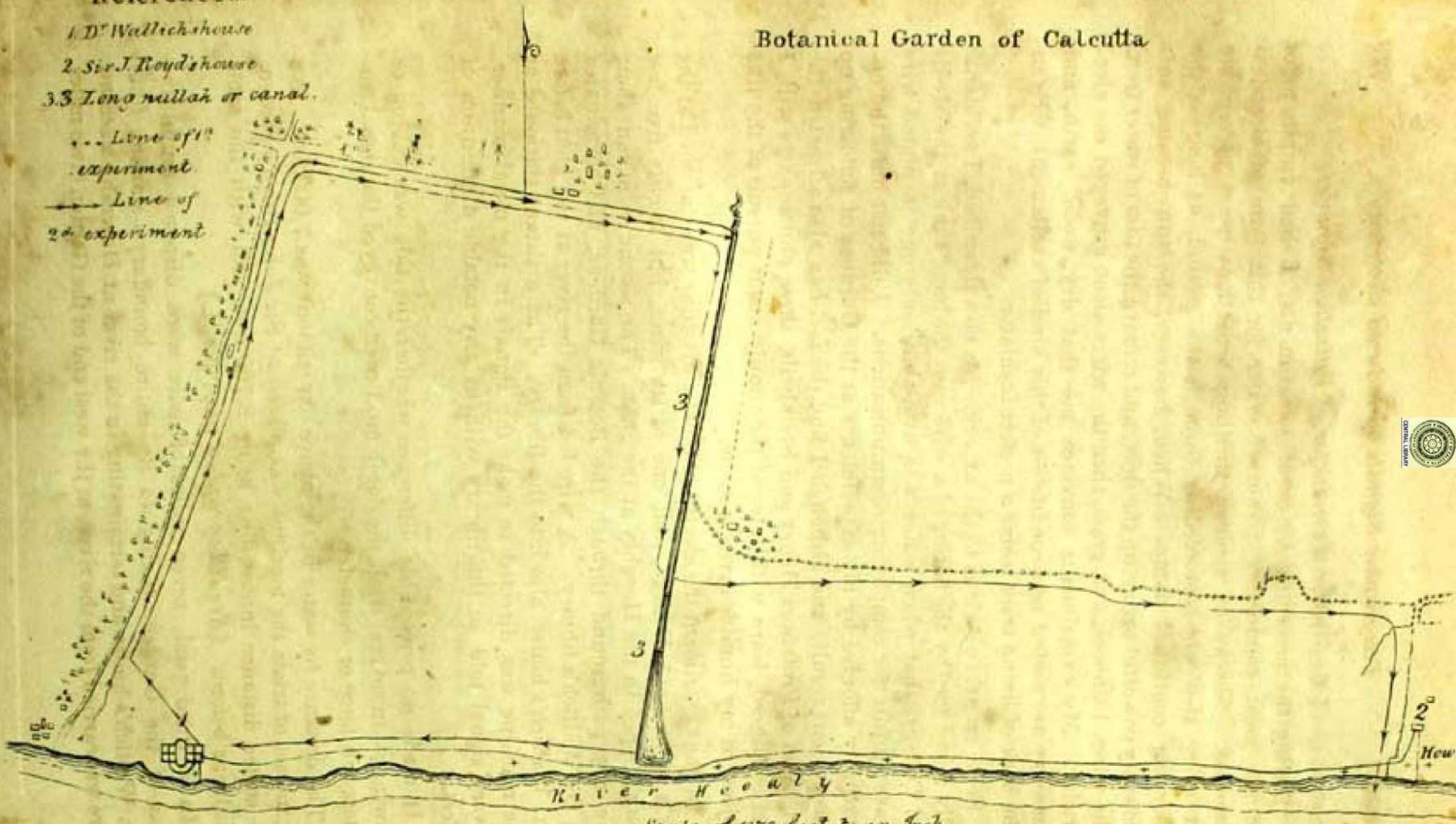
References.

1. Dr Wallich's house
2. Sir J. Royd's house
3.3. Long nullah or canal.

... Line of 1st experiment

——→ Line of 2d experiment

Botanical Garden of Calcutta



Scale of 1078 feet to an Inch.



T.Black Lith

W.B.O.S. delt

Electro-telegraphic Signals conveyed by Water

§ 6.—*Water a conductor of Pulsation Signals.*

During the preceding series of experiments, I had ample proof of the great conducting power of water for this form of electrical impulse. Shocks or strange thrilling sensations were perceptible at every step while proceeding through the ground, as long as the morning continued damp. When, however, the sun became sufficiently powerful to dry up the dew, and remove the film of water from the wires, bamboos, and grass, then the wires alone conveyed the electricity. My experiments convince me that dry wood, earth, and masonry are perfect non-conductors of this kind of excitement. Even the bark of living trees seems a perfect insulator.

Some months prèvious to the experiments now described, I accidentally found too (by the falling of a wire into the large tank at the Medical College) that when water was available, only one insulated wire was requisite for completing communications. I did not omit the opportunity afforded by my experiments at the Gardens of following up this curious result, and although I find the fact has also attracted the attention of Professors Henry and Steinheils, these philosophers will, I feel convinced, learn with interest the simultaneous pursuit of the like object, in my humble investigations.

In one experiment the electro-magnetic machine was stationed at the ghât of Bishop's College, and one of its wires, but twenty-five feet long, dipped in the Hooghly at the ghât. The second wire ran along the dry path round through the Botanic Gardens, and terminated in Dr. Wallich's library. A wire led from the river at the ghât before Dr. Wallich's house, also into the library. The assistant stationed at the machine was directed to make the signals in the usual manner. Every signal told in the library without any notable diminution of effect.

It made no perceptible difference whether the tide was ebbing or flowing ;—in several trials the damp mud even conveyed the signal unaltered in force or character.

The distance by water in the above experiment was 7,000 feet. In a second set of trials the machine was placed at Sir John Royd's garden, the water distance intervening being 9,700 feet, and with the same results as before. (*See lithographed plan No.* 1.)

In a third trial, seven miles of wire were disposed round the trees of the Garden, taking in its entire boundary—starting from Dr. Wallich's house and terminating in the river at Howrah ; a second wire was carried from the river, at the west end of the Garden (two miles

of the Hooghly being interposed) and proceeded to the north extremity of a nullah 3,000 feet in length; from the south end of the nullah a wire returned to the library. Thus we had altogether eleven miles of metallic and 13,256 feet of water circuit, the latter in two interruptions. The signal still passed as intelligibly and strongly as before. A lithographic plan is annexed in illustration of these details.

---

§ 7.—*General remarks on the applicability of the preceding facts.*

I reserve for another occasion the description of several experiments which these facts led to, regarding the possibility of dispensing altogether with metallic conductors; and I now proceed to shew some practical circumstances, expenses, and other details regarding the application of these facts to the actual accomplishment of telegraphic correspondence.

To effect a perfect system of telegraphic communication for a distance, say of 500 miles, two wires are at most required; where a river passes between the termini, but one wire is necessary. If the water communication be the sea, the distance for which one wire will suffice will be at least quadrupled. Insulation of one wire is necessary. The wire may touch dry substances of any kind, but it must not come in contact with water or damp earth communicating with the second wire or with the river course.

Insulation according to my experiments is best accomplished by enclosing the wire (previously pitched) in a split ratan, and then paying the ratan round with tarred yarn—or the wire may, as in some experiments recently made by Colonel Pasley in Chatham, be surrounded by strands of tarred rope, and this by pitched yarn.

An insulated rope of this kind may be spread along a wet field, nay, even led through a river, and will still conduct without any appreciable loss the electrical signals above described.

In establishing a communication it would be advisable to bury the wire about two feet below the surface of the ground, in a narrow trench well rammed with pounded brick and mortar. At every ten miles the wire should rise through the ground in a masonry pillar, to allow of verification or of the discovery of the situation of accident. In India the Police Thannah houses might be conveniently used for this purpose.

The expense of copper wire per mile would be 272 rupees; of insulation 20; of trenching and masonry I can form no accurate estimate.

As no intermediate stations would be required, the expenses of establishment would be very trivial.

The cost of a magneto-electric machine of the maximum power would not exceed 20*l*. The galvanic apparatus, constructed on the principle I described in 1837, would not at most cost 10*l*. and would probably cost 5*l*. per month for its constant support.

In Europe or America there exists no difficulty whatever to the adoption of this system of correspondence. In India unquestionably the obstacles are greater. Perhaps, however, on the other hand the very wildness of our jungle tracts would rather protect than endanger the buried wire. If properly laid down, in a few months none but those instructed, could find it. But wherever a railroad exists, there this method can be at once adopted. Indeed its applicability is so certain and infallible, its principles so simple, that I often wonder it has not been previously employed or even announced, and that the justly celebrated Mr. Wheatstone should have taken out a patent for a five-wired telegraph when every railroad in England already gives the required conductors.

The progress of science is hourly adding to the catalogue of triumphs effected by the sagacity of man over the seeming impossibilities of nature. Our own day has witnessed the miracle of gas illumination—the discovery of precious metals in potashes and in common salt—the extrication of the electric spark through the influence of magnetism—the solidification of carbonic acid—the fixing by the sun's light of the pictures it forms whether by shadow, reflection, or refraction. A conquest still greater than all which I have quoted would be the annihilation of time and space in the accomplishment of correspondence. That a signal can be passed between places 1,000 miles apart in less time than the motion of solar light through the firmament, is no less startling to assert than it is demonstrably and practically true.

ART. VII.—*Extract from a Memoir on the Preparations of the Indian Hemp, or Gunjah,* (Cannabis Indica) *their effects on the Animal system in Health, and their utility in the Treatment of Tetanus and other Convulsive Diseases.—By* W. B. O'SHAUGHNESSY, M. D. *Professor in the Medical College of Calcutta, &c. &c.**

The narcotic effects of Hemp are popularly known in the south of Africa, South America, Turkey, Egypt, Asia Minor, India, and the adjacent territories of the Malays, Burmese, and Siamese. In all these countries Hemp is used in various forms, by the dissipated and depraved, as the ready agent of a pleasing intoxication. In the popular medicine of these nations, we find it extensively employed for a multitude of affections. But in western Europe its use either as a stimulant or as a remedy, is equally unknown. With the exception of the trial, as a frolic, of the Egyptian "Hasheesh," by a few youths in Marseilles, and of the clinical use of the wine of Hemp by Hahneman, as shewn in a subsequent extract, I have been unable to trace any notice of the employment of this drug in Europe.

Much difference of opinion exists on the question, whether the Hemp so abundant in Europe, even in high northern latitudes, is identical in specific characters with the Hemp of Asia Minor and India. The extraordinary symptoms produced by the latter depend on a resinous secretion with which it abounds, and which seems totally absent in the European kind. The closest physical resemblance or even identity exists between both plants—difference of climate seems to me more than sufficient to account for the absence of the resinous

* Read before the Medical and Physical Society of Calcutta, on the 2d October, 1839.

We have extracted from this paper the sections relative to the popular uses and the effects on the animal system of these singular and valuable narcotics—for the professional details of cases, which we considered unsuited to our pages, we have to refer the reader to the *Transactions of the Medical and Physical Society*, current volume, fasciculus, for November, 1839.—EDS.

secretion, and consequent want of narcotic power in that indigenous in colder countries.

In the subsequent article I first endeavour to present an adequate view of what has been recorded of the early history, the popular uses, and employment in medicine of this powerful and valuable substance; I then proceed to notice several experiments which I have instituted on animals, with the view to ascertain its effects on the healthy system; and, lastly, I submit an abstract of the clinical details of the treatment of several patients afflicted with hydrophobia, tetanus, and other convulsive disorders, in which a preparation of Hemp was employed with results, which seem to me to warrant our anticipating from its more extensive and impartial use no inconsiderable addition to the resources of the physician.

In the historical and statistical department of the subject, I owe my cordial thanks for most valuable assistance to the distinguished traveller the Syed Keramut Ali, Mootawulee of the Hooghly Imambarrah, and also to the Hakim Mirza Abdul Razes of Teheran, who have furnished me with interesting details regarding the consumption of Hemp in Candahar, Cabul, and the countries between the Indus and Herat. The Pandit Moodoosudun Gooptu has favoured me with notices of the statements regarding Hemp in the early Sanscrit authors on Materia Medica;—to the celebrated Kamalakantha Vidyalanka, the Pandit of the Asiatic Society, I have also to record my acknowledgments;—Mr. DaCosta has obligingly supplied me with copious notes from the 'Mukzun-ul-Udwieh' and other Persian and Hindee systems of Materia Medica. For information relative to the varieties of the drug, and its consumption in Bengal, Mr. McCann, the Deputy Superintendent of Police, deserves my thanks;—and, lastly, to Dr. Goodeve, to Mr. Richard O'Shaughnessy, to the late Dr. Bain, to Mr. O'Brien of the Native Hospital, and Nobinchunder Mitter, Sub-Assistant Surgeon, I feel deeply indebted for the clinical details with which they have enriched the subject.

SECTION I.

Botanical characters——Chemical Properties—Production.

BOTANICAL DESCRIPTION.—Assuming with Lindley and other eminent writers that the *Cannabis sativa* and *Indica* are identical, we find that the plant is diœcious, annual, about three feet high, covered over with a fine pubescence; the stem is erect, branched, bright green, angular; leaves, alternate or opposite, on long weak petioles; digitate, scabrous, with linear, lanceolate, sharply serrated leaflets, tapering into a long smooth entire point; stipules subulate; clusters of flowers axillary with subulate bractes; males lax and drooping, branched and leafless at base; females erect, simple and leafy at the base. ♂ Calyx downy, five parted, imbricated. Stamens five; anthers large and pendulous. ♀ Calyx covered with brown glands. Ovary roundish with pendulous ovule, and two long filiform glandular stigmas; achenium ovate, one seeded.—*v. Lindley's Flora Medica, p.* 299.*

The fibres of the stems are long and extremely tenacious, so as to afford the best tissue for cordage, thus constituting the material for one of the most important branches of European manufactures.

The seed is simply albuminous and oily, and is devoid of all narcotic properties.

CHEMICAL PROPERTIES.—In certain seasons and in warm countries a resinous juice exudes and concretes on the leaves, slender stems, and flowers;—the mode of removing this juice will be subsequently detailed. Separated and in masses it constitutes the *Churrus*† of Nipal and Hindostan, and to this the type, or basis of all the Hemp preparations, are the powers of these drugs attributable.

The resin of the Hemp is very soluble in alcohol and ether; partially soluble in alkaline; insoluble in acid solutions; when pure, of a blackish grey colour; hard at 90°; softens at higher temperatures, and fuses readily;—soluble in the fixed and in several volatile oils. Its

* The drawing which illustrates this paper has been copied by my accomplished friend Dr. George Wallich, from Roxburgh's unpublished plate.

† For very fine specimens of *Churrus*, I have to express my thanks to Dr. Campbell, late assistant Resident at Nipal.

odour is fragrant and narcotic; taste slightly warm, bitterish, and acrid.

The dried Hemp plant which has flowered and *from which the resin has not been removed* is called *Gunjah*. It sells for twelve annas to one rupee the seer, in the Calcutta bazars, and yields to alcohol twenty per 100 of resinous extract, composed of the resin *(churrus)*, and green colouring matter *(chlorophylle)*. Distilled with a large quantity of water, traces of essential oil pass over, and the distilled liquor has the powerful narcotic odour of the plant. The *Gunjah* is sold for smoking chiefly. The bundles of *Gunjah* are about two feet long and three inches in diameter, and contain twenty-four plants. The colour is dusky green—the odour agreeably narcotic—the whole plant resinous and adhesive to the touch.

The larger leaves and capsules without the stalks, are called "*Bang, Subjee* or *Sidhee.*" They are used for making an intoxicating drink, for smoking, and in the conserve or confection termed *Majoon*. *Bang* is cheaper than *Gunjah*, and though less powerful, is sold at such a low price that for one pice enough can be purchased to intoxicate an "experienced" person.

According to Mr. McCann's notes, the *Gunjah* consumed in Bengal is chiefly brought from Mirzapúr and Ghazeepore, being extensively cultivated near Gwalior and in Tirhoot. The natives cut the plant when in flower, allow it to dry for three days, and then lay it in bundles averaging one seer weight each, which are distributed to the licensed dealers. The best kinds are brought from Gwalior and Bhurtpore, and it is also cultivated, of good quality, in a few gardens round Calcutta. In Jessore, I am informed, the drug is produced of excellent quality, and to a very considerable extent of cultivation.

In Central India and the Saugor territory and in Nipal, *Churrus* is collected during the hot season in the following singular manner. Men clad in leathern dresses run through the Hemp-fields brushing through the plant with all possible violence; the soft resin adheres to the leather, and is subsequently scraped off and kneaded into balls, which sell from five to six rupees the seer. A still finer kind, the *Momeea* or waxen *Churrus*, is collected by the hand in Nipal, and sells for nearly double the price of the ordinary kind. In Nipal, Dr. McKinnon informs me, the leathern attire is dispensed with, and the resin is gathered on

the skins of naked coolies. In Persia, it is stated by Mirza Abdul Razes that the *Churrus* is prepared by pressing the resinous plant on coarse cloths, and then scraping it from these and melting it in a pot with a little warm water. He considers the *Churrus* of Herat as the best and most powerful of all the varieties of the drug.

SECTION II.

Popular uses.

The preparations of Hemp are used for the purpose of intoxication as follows.

Sidhee, *Subjee*, and *Bang* (synonymous) are used with water as a drink, which is thus prepared. About three tola weight, 540 troy grains, are well washed with cold water, then rubbed to powder, mixed with black pepper, cucumber and melon seeds, sugar, half a pint of milk, and an equal quantity of water. This is considered sufficient to intoxicate an habituated person. Half the quantity is enough for a novice. This composition is chiefly used by the Mahomedans of the better classes.

Another recipe is as follows.

The same quantity of *Sidhee* is washed and ground, mixed with black pepper, and a quart of cold water added. This is drank at one sitting. This is the favorite beverage of the Hindus who practice this vice, especially the Birjobassies and many of the Rajpootana soldiery.

From either of these beverages intoxication will ensue in half an hour. Almost invariably the inebriation is of the most cheerful kind, causing the person to sing and dance, to eat food with great relish, and to seek aphrodisiac enjoyments. In persons of a quarrelsome disposition it occasions, as might be expected, an exasperation of their natural tendency. The intoxication lasts about three hours, when sleep supervenes. No nausea or sickness of stomach succeeds, nor are the bowels at all affected; next day there is slight giddiness and vascularity of the eyes, but no other symptom worth recording.

Gunjah is used for smoking alone—one rupee weight, 180 grains, and a little dried tobacco are rubbed together in the palm of the hand with a few drops of water. This suffices for three persons. A little

tobacco is placed in the pipe first, then a layer of the prepared *Gunjah*, then more tobacco, and the fire above all.

Four or five persons usually join in this debauch. The hookah is passed round, and each person takes a single draught. Intoxication ensues almost instantly; and from one draught to the unaccustomed, within half an hour; and after four or five inspirations to those more practised in the vice. The effects differ from those occasioned by the *Sidhee*. Heaviness, laziness, and agreeable reveries ensue, but the person can be readily roused, and is able to discharge routine occupations, such as pulling the punkah, waiting at table, &c.

The *Majoon*, or Hemp confection, is a compound of sugar, butter, flour, milk, and *Sidhee* or *Bang*. The process has been repeatedly performed before me by Ameer, the proprietor of a celebrated place of resort for Hemp devotees in Calcutta, and who is considered the best artist in his profession. Four ounces of *Sidhee* and an equal quantity of *Ghee* are placed in an earthen or well-tinned vessel, a pint of water added, and the whole warmed over a charcoal fire. The mixture is constantly stirred until the water all boils away, which is known by the crackling noise of the melted butter on the sides of the vessel; the mixture is then removed from the fire, squeezed through cloth while hot—by which an oleaginous solution of the active principles and colouring matter of the Hemp is obtained—and the leaves, fibres, &c., remaining on the cloth are thrown away.

The green oily solution soon concretes into a buttery mass, and is then well washed by the hand with soft water so long as the water becomes coloured. The colouring matter and an extractive substance are thus removed, and a very pale green mass, of the consistence of simple ointment, remains. The washings are thrown away;—Ameer says that these are intoxicating, and produce constriction of the throat, great pain, and very disagreeable and dangerous symptoms.

The operator then takes two pounds of sugar, and adding a little water places it in a pipkin over the fire. When the sugar dissolves and froths, two ounces of milk are added; a thick scum rises and is removed—more milk and a little water are added from time to time, and the boiling continued about an hour, the solution being carefully stirred until it becomes an adhesive clear syrup, ready to solidify on a cold surface; four ounces of tyre (new milk dried before the sun) in fine powder are

now stirred in, and lastly the prepared butter of Hemp is introduced, brisk stirring being continued for a few minutes. A few drops of uttur of roses are then quickly sprinkled in, and the mixture poured from the pipkin on a flat cold dish or slab. The mass concretes immediately into a thin cake, which is divided into small lozenge-shaped pieces. A seer thus prepared sells for four rupees: one drachm by weight will intoxicate a beginner; three drachms one experienced in its use. The taste is sweet, and the odour very agreeable.

Ameer states that there are seven or eight *Majoon* makers in Calcutta;—that sometimes by special order of customers he introduces stramonium seeds, but never nux-vomica;—that all classes of persons, including the lower Portuguese or "Kala Feringhees," and especially their females, consume the drug;—that it is most fascinating in its effects, producing extatic happiness, a persuasion of high rank, a sensation of flying, voracious appetite, and intense aphrodisiac desire. He denies that its continued use leads to madness, impotence, or to the numerous evil consequences described by the Arabic and Persian physicians. Although I disbelieve Ameer's statements on this point, his description of the immediate effects of *Majoon* is strictly and accurately correct.

Most carnivorous animals eat it greedily, and very soon experience its narcotic effects, becoming ludicrously drunk, but seldom suffering any worse consequences.

SECTION III.

Historical details—Notices of Hemp, and its popular uses, by the Sanscrit, Arabic, and Persian writers.

The preceding notice suffices to explain the subsequent historical and medicinal details. I premise the historical, in order to shew the exact state of our knowledge of the subject, when I attempted its investigation.

Although the most eminent of the Arabic and Persian authors concur in referring the origin of the practice of Hemp intoxication to the natives of Hindoostan, it is remarkable that few traces can be detected of the prevalence of the vice at any early period in India.

The Pandit Moodoosudun Gooptu finds that the "Rajniguntu," a standard treatise on Materia Medica, which he estimates vaguely at 600 years date, gives a clear account of this agent. Its synonymes are "*Bijoya*," "*Ujoya*," and "*Joya*,"—names which mean, promoters of success; "*Brijputta*," or the strengthener, or the strong-leaved; "*Chapola*," the causer of a reeling gait; "*Ununda*," or the laughter-moving; "*Hursiní*," the exciter of sexual desire. Its effects on man are described as excitant, heating, astringent. It is added that it "destroys phlegm, expels flatulence, induces costiveness, sharpens the memory, increases eloquence, excites the appetite, and acts as a general tonic."

The "Rajbulubha," a Sanscrit treatise of rather later date, alludes to the use of Hemp in gonorrhæa, and repeats the statements of the "Rajniguntu." In the Hindu Tantra, or a religious treatise, teaching peculiar and mystical formulæ and rites for the worship of the deities, it is said, moreover, that *Sidhee* is more intoxicating than wine.

In the celebrated "Susruta," which is perhaps the most ancient of all Hindu medical works, it is written, that persons labouring under catarrh should, with other remedies, use internally the *Bijoya* or *Sidhee*. The effects however are not described.

The learned Kamalakantha Vidyalanka has traced a notice of Hemp in the 5th chapter of *Menu*, where Brahmins are prohibited to use the following substances, *Palandoo* or onions, *Gunjara* or *Gunjah*, and such condiments as have strong and pungent scents.

The Arabic and Persian writers are however far more voluminous and precise in their accounts of these fascinating preparations. In the 1st vol. of De Sacy's "Crestomathie Arabe" we find an extremely interesting summary of the writings of Takim Eddin Makrizi on this subject. Lane has noticed it too with his usual ability in his admirable work "the Modern Egyptians." From these two sources, the MS. notes of the Syed Keramut Ali and Mr. DaCosta, and a curious paper communicated by our friend Mirza Abdul Razes, a most intelligent Persian physician, the following epitome is compiled.

Makrizi treats of the Hemp in his glowing description of the celebrated Canton de la Timbalíere, or ancient pleasure grounds, in the vicinity of Cairo. This quarter, after many vicissitudes, is now a heap of ruins. In it was situated a cultivated valley named Djoneina, which we are informed was the theatre of all conceivable abomina-

tions. It was famous above all for the sale of the *Hasheeha*, which is still greedily consumed by the dregs of the populace, and from the consumption of which sprung the excesses which led to the name of "Assassin" being given to the Saracens in the Holy Wars. The history of the drug the author treats of thus:—The oldest work in which Hemp is noticed is a treatise by Hasan, who states that in the year 658, M. E. the Sheikh Djafar Shirazi, a monk of the order of Haider, learned from his master the history of the discovery of Hemp. Haider, the chief of ascetics and self-chasteners, lived in rigid privation on a mountain between Nishabor and Ramah, where he established a monastery of Fakirs. Ten years he had spent in this retreat without leaving it for a moment, till one burning summer's day when he departed alone to the fields. On his return an air of joy and gaiety was imprinted on his countenance; he received the visits of his brethren and encouraged their conversation. On being questioned, he stated that struck by the aspect of a plant which danced in the heat as if with joy, while all the rest of the vegetable creation was torpid, he had gathered and eaten of its leaves. He led his companions to the spot,—all ate and all were similarly excited. A tincture of the Hemp leaf in wine or spirit seems to have been the favorite formula in which the Sheikh Haider indulged himself. An Arab poet sings of Haider's *emerald* cup—an evident allusion to the rich green colour of the tincture of the drug. The Sheikh survived the discovery ten years, and subsisted chiefly on this herb, and on his death his disciples by his desire planted it in an arbour about his tomb.

From this saintly sepulchre the knowledge of the effects of Hemp is stated to have spread into Khorasan. In Chaldea it was unknown until 728 M. E. during the reign of the Khalif Mostansir Billah: the kings of Ormus and Bahrein then introduced it into Chaldea, Syria, Egypt, and Turkey.

In Khorasan however, it seems that the date of the use of Hemp is considered to be far prior to Haider's era. Biraslan, an Indian pilgrim, the contemporary of Cosröes,* is believed to have introduced and

* By this term is probably meant the first of the Sassanian dynasty, to whom the epithet "of Khusrow" or Cosröes, equivalent to Káiser, Cæsar, or Czar, has been applied in many generations. This dynasty endured from A. D. 202 to A. D. 636—*Vide note* 50 *to Lane's translation of the Arabian Nights, vol.* ii. p. 226.

diffused the custom through Khorasan and Yemen. In proof of the great antiquity of the practice, certain passages in the works of Hippocrates may be cited, in which some of its properties are clearly described—but the difficulty of deciding whether the passages be spurious or genuine, renders the fact of little value. Dioscorides (lib. ij. cap. 169,) describes Hemp, but merely notices the emollient properties of its seeds—its intoxicating effects must consequently be regarded as unknown to the Greeks prior to his era, which is generally agreed to be about the second century of the Christian epoch, and somewhat subsequent to the lifetime of Pliny.

In the narrative of Makrizi we also learn that oxymel and acids are the most powerful antidotes to the effects of this narcotic; next to these, emetics, cold bathing, and sleep; and we are further told that it possesses diuretic, astringent, and especially aphrodisiac properties. Ibn Beitar was the first to record its tendency to produce mental derangement, and he even states that it occasionally proves fatal.

In 780 M. E. very severe ordinances were passed in Egypt against the practice: the Djoneina garden was rooted up, and all those convicted of the use of the drug were subjected to the extraction of their teeth; but in 799 the custom re-established itself with more than original vigour. Makrizi draws an expressive picture of the evils this vice then inflicted on its votaries—"As its consequence, general corruption of sentiments and manners ensued, modesty disappeared, every base and evil passion was openly indulged in, and nobility of external form alone remained to these infatuated beings."

Section IV.

Medicinal properties assigned to Hemp by the ancient Arabian and Persian writers, and by modern European authors.

In the preceding notice of Makrizi's writings on this subject we have confined ourselves chiefly to historical details, excluding descriptions of supposed medicinal effects. The Mukzun-ul-Udwieh and the Persian MS. in our possession, inform us as to the properties which the ancient physicians attributed to this powerful narcotic.

In Mr. DaCosta's MS. version of the chapter on Hemp in the Mukzun-ul-Udwieh, *Churrus*, we are informed, if smoked through a pipe causes torpor and intoxication, and often proves fatal to the smoker. Three kinds are noticed, the *garden*, *wild*, and *mountain*, of which the last is deemed the strongest;—the seeds are called *sheadana* or *shaldaneh* in Persia. These are said to be "a compound of opposite qualities, cold and dry in the third degree, that is to say, stimulant and sedative, imparting at first a gentle reviving heat, and then a considerable refrigerant effect."

The contrary qualities of the plant, its stimulant and sedative effects, are prominently dwelt on. "They at first exhilarate the spirits, cause cheerfulness, give colour to the complexion, bring on intoxication, excite the imagination into the most rapturous ideas, produce thirst, increase appetite, excite concupiscence. Afterwards the sedative effects begin to preside, the spirits sink, the vision darkens and weakens; and madness, melancholy, fearfulness, dropsy, and such like distempers, are the sequel—and the seminal secretions dry up. These effects are increased by sweets, and combated by acids."

The author of the Mukzun-ul-Udwieh further informs us—

"The leaves make a good snuff for deterging the brain; the juice of the leaves applied to the head as a wash, removes dandriff and vermin; drops of the juice thrown into the ear allay pain and destroy worms or insects. It checks diarrhœa, is useful in gonorrhœa, restrains seminal secretions, and is diuretic. The bark has a similar effect."

"The powder is recommended as an external application to fresh wounds and sores, and for causing granulations; a poultice of the boiled root and leaves for discussing inflammations, and cure of erysipelas, and for allaying neuralgic pains. The dried leaves bruised and spread on a castor oil leaf cure hydrocele and swelled testes. The *dose* internally is one *direm*, or 48 grains. The antidotes are emetics, cow's milk, hot water, and sorrel wine."

Alluding to its popular uses, the author dwells on the eventual evil consequences of the indulgence;—weakness of the digestive organs first ensues, followed by flatulency, indigestion, swelling of the limbs and face, change of complexion, diminution of sexual vigor, loss of teeth, heaviness, cowardice, depraved and wicked ideas, scepticism in religi-

ous tenets;—licentiousness and ungodliness are also enumerated in the catalogue of deplorable results.

The medicinal properties of Hemp, in various forms, are the subject of some interesting notes by Mirza Abdul Razes. "It produces a ravenous appetite and constipation, arrests the secretions except that of the liver, excites wild imagining, especially a sensation of ascending, forgetfulness of all that happens during its use, and such mental exaltation, that *the beholders attribute it to supernatural inspiration.*"

Mirza Abdul considers Hemp to be a powerful exciter of the flow of bile, and relates cases of its efficacy in restoring appetite—of its utility as an external application as a poultice with milk, in relieving hæmorrhoids—and internally in gonorrhœa to the extent of a quarter drachm of *bangh*. He states also that the habitual smokers of *Gunjah* generally die of diseases of the lungs, dropsy, and anasarca—"so do the eaters of *Majoon* and smokers of *Sidhee*, but at a later period. The inexperienced on first taking it are often senseless for a day, some go mad, others are known to die."

In the 35th chapter of the 5th volume of Rumphius' Herbarium Amboinense, p. 208, Ed. Amsterd. A. D. 1695, we find a long and very good account of this drug, illustrated by two excellent plates. The subjoined is an epitome of Rumphius' article.

Rumphius first describes botanically the male and female Hemp plants, of which he gives two admirable drawings. He assigns the upper provinces of India as its *habitat*, and states it to be cultivated in Java and Amboyna. He then notices very briefly the exciting effects ascribed to the leaf, and to mixtures thereof with spices, camphor, and opium. He alludes doubtingly to its alleged aphrodisiac powers, and states that the kind of mental excitement it produces depends on the temperament of the consumer. He quotes a passage from Galen, lib. i. (de aliment, facult) in which it is asserted that in that great writer's time it was customary to give Hemp seed to the guests at banquets as promoters of hilarity and enjoyment. Rumphius adds, that the Mahomedans in his neighbourhood frequently sought for the male plant from his garden to be given to persons afflicted with virulent gonorrhœa and with asthma, or the affection which is popularly called "stitches in the side." He tells us, moreover, that the powdered

leaves check diarrhœa, are stomachic, cure the malady named *pilao*, and moderate excessive secretion of bile. He mentions the use of Hemp smoke as an enema in strangulated hernia, and of the leaves as an antidote to poisoning by orpiment. Lastly, he notices in the two subsequent chapters varieties of Hemp which he terms the *Gunjah sativa* and *Gunjah agrestis*. In the *Hortus Malabaricus* Rheedes' article on the Hemp is a mere outline of Rumphius' statements.

Among modern European writers the only information I could trace on the medicinal use of Hemp *in Europe*, is in the recent work of Ness v. Esenbeck, from which the following is an extract kindly supplied by Dr. Wallich :—

"The fresh herb of the Hemp has a very powerful and unpleasant narcotic smell, and is used in the East in combination with opium, in the preparation of intoxicating potions, &c. It is probable that the *nepenthe* of the ancients was prepared from the leaves of this plant. Many physicians, Hahnemann among them, prescribe the vinous extract in various nervous disorders, where opium and hyoscyamus used to be employed, being less heating and devoid of bitterness."*

No information as to the medicinal effects of Hemp exists in the standard works on Materia Medica, to which I have access. Soubeiran, Feé, Merat, and de Lens in their admirable dictionary; Chevalier and Richard, Roques (Phytographie Medicale); Ratier and Henry (Pharmacopeé Française); and the Dictionnaire des Sciences Medicales—are all equally silent on the subject.

In *Ainslie's Materia Indica*, 2nd vol. we find three notices of the plant and its preparations.

At page 39 "Banghie," (*Tamul*) with the Persian and Hindee synonymes of "Beng" and "Subjee," is described as an intoxicating liquor prepared with the leaves of the *Gunjah*, or Hemp plant.

Under the head *Gunjah*, Ainslie gives numerous synonymes, and tells that the leaves are sometimes prescribed in cases of diarrhœa; and in conjunction with turmeric, onions, and warm gingilie oil are made into an unction for painful protruded piles. Dr. Ainslie also gives a brief view of the popular uses and botanical peculiarities of the plant.

* *Handbuch der Medicin : und Pharmac : Botanik, von F. Ness von Esenbeck et Dr. Carl Ebermaier. vol.* 1, *p.* 338.

Majoon, lastly, is described by Dr. Ainslie, page 176, as a preparation of sugar, milk, ghee, poppy seeds, flowers of the datura, powder of nux-vomica, and sugar. The true *Majoon* however as prepared in Bengal contains neither datura nor nux-vomica. I have already described the process by which it has been manufactured before me.

In the *Journal de Pharmacie*, the most complete Magazine in existence on all pharmaceutical subjects, we find Hemp noticed in several volumes. In the Bulletin de Pharmacie t. v. A. 1810, p. 400, we find it briefly described by M. Rouyer, apothecary to Napoleon, and member of the Egyptian scientific commission, in a paper on the popular remedies of Egypt. With the leaves and tops, he tells us, collected before ripening, the Egyptians prepare a conserve, which serves as the base of the *berch*, the *diasmouk*, and the *bernaouy*. Hemp leaves reduced to powder and incorporated with honey or stirred with water constitute the *berch* of the poor classes.

The same work also, (Bulletin, vol. i. p. 523, A. 1809,) contains a very brief notice on the intoxicating preparations of Hemp, read by M. De Sacy before the Institute of France in July, 1809. M. De Sacy's subsequent analysis of Makrizi, of which I have given an outline, is however much more rich in details than the article in the Bulletin.

(To be continued.)

ART. VII.—*Memoir on the Climate, Soil, Produce and Husbandry of Afghanistan and the Neighbouring Countries.—By Lieut.* IRWIN.

It gives us great pleasure to be the means of rescuing from undeserved oblivion, the admirable Memoir on Afghanistan, of which we now present to our readers the first part. The author (then) Lieut. IRWIN accompanied Mr. ELPHINSTONE in his Mission to Cabul, and is honorably mentioned in the preface to Mr. E's justly celebrated work. The Memoir we now publish exists in the Library of the Asiatic Society, and was first brought to our notice by Captain CUNNINGHAM of the Bengal Engineers. Subsequently Dr. SPRY struck by the value of its details on rural economy, proposed its publication to the Agri-

cultural Society. We were unwilling to concede even to that most useful public body, the honor of discharging a duty we felt to be peculiarly our own; our readers will doubtless be gratified at our thus enriching our pages.

In the next number we hope to communicate some information regarding the accomplished author; who, we understand is now a resident in Van Dieman's Land.—EDS.

Plan and Division of the Memoir.

The first 47 paragraphs compose an Introduction which treats of the natural division of the countries under view, their chief ranges of mountains and rivers. I here assign the extent in which I understand the various names for countries, provinces, and districts; without this precaution the matter which follows would have been obscure or prolix, perhaps both. This is divided into four parts. The first part treats of Climate, and is divided into four sections, in which are discussed in their order, the temperature, the winds, the rains, and the salubrity. The second part treats of the Soil, and has no division. The third part treats of Natural History, and is divided into three sections;—in the first, are mentioned the mines and mineral products of these kingdoms; in the second, the most remarkable vegetables; in the third, the animals and carriage. In this part of the memoir some matter has found a place which will scarcely be reckoned interesting in a public view, but which was naturally introduced from the desire of completing the plan originally proposed. The fourth part is an attempt to give some idea of the husbandry. The second, which I entitle "a review of the districts," details what are the chief occupations and means of subsistence, the chief live stock and kinds of grain, the plenty or scarcity of supplies, and some particulars of a miscellaneous nature; it concludes with an estimate of the population.

The following is a briefer sketch of the contents of this memoir:

Introduction,
I. Climate.—1 Temperature,—2 Winds,—3 Rains,—4 Salubrity.
II. Soil.
III. Natural History.—1 Minerals,—2 Vegetables,—3 Animals.
IV. Husbandry and Cultivation.—1 Husbandry,—2 Review of the Districts.

Of the Climate, Soil, Products, and Husbandry of Afghanistan and the Neighbouring Countries.

In the following pages I treat of a wide extent of country, being nearly the whole of the space of which a map has lately been constructed by Lieut. Macartney. In a more particular manner will be treated Afghanistan, which is centrical in it. Such is the extent and diversity of this last country alone, that were our attention confined to it, still could a brief treatise contain but cursory notices even of the important parts of a subject so extensive; much more must it be so, when the neighbouring tracts are to be in some measure included in the survey. With respect to the accuracy also of the matter here offered, although it be hoped that there is a considerable preponderance of truth, it must be supposed that in the circumstances under which it has been collected and digested, the errors too must be numerous.

2. Afghanistan is bounded on the north by mountains which divide it from Kashkar and Budukhshan; other mountains divide it on the north-west from that part of Toorkistan which lies on this side of the Oxus, and that part of Khoorasan which extends north nearly to that river; on the west it includes a part of that famous geographical division; while beyond in this direction is the Persian Khoorasan; to the south it has deserts and Bulochistan. The Indus from its exit from the lofty mountains in about the latitude of 45° N. sometimes constitutes its eastern boundary, and sometimes is comprehended in it, as will be in the sequel more fully explained. Discarding the provinces of Sindh and Kushmeer, as if parts of India, and also the provinces lately belonging to the monarchy in the south-east of Toorkistan, with the contiguous ones in the north-east of Khoorasan, the Afghan people and government may be considered as included within the 35th and 29th degrees of north latitude and the 62nd and 73rd of east longitude.

3. Without discussing the nature of the political connection between Bulochistan and the Afghan monarchy, it seems sufficient for us that there is a practical convenience in naming and considering them separately. Bulochistan, so called from two nations called Bulochis, who compose the bulk of its population, has Afghanistan to the north, a desert dividing it in that quarter from Seestan, (Seestan on the whole lies north-west of Bulochistan); to the west, deserts or very ill-peopled tracts divide it from the Persian province Kirman; to the south is the sea; and to the east Sindh. The government of Sindh

possesses the port of Kirachee, which may be considered as locally within Bulochistan. The country is thus included within the 25th and 31st degrees of north latitude, and the 60th and 70th of east longitude.

4. We have already seen that Afghanistan embraces a part of Khoorasan, an ancient geographical division which has been recognized downwards from the earliest times, not merely in books but in common conversation, and that with little variation, notwithstanding the frequent changes of dominion and even of population in the country. We are not concerned with its southern or western boundaries. To the east it extends in one point to Mookr, and in that neighbourhood may be considered as ending where considerable heights begin; it thus includes the whole of the Dooranee country. Seestan too is but a division of it. In more northern latitudes its extent is more difficult to fix. The western part of the Paraparnisan range of hills with the valleys contained and the neighbouring plains—forming together the country of the Ymaks—both was and is considered as part of Khoorasan; but the eastern part of the same tract which the Huzaras possess may more properly be stiled a broad boundary between it and Hindoostan, in its largest sense, which includes Cabul and even Ghuznee. Still more to the north Khoorasan in ancient times extended to the confines of Budukhshan, thus including Mymuna, Undkho, Bulkh, Koonduz, Khoollum, Ghoree, and Talikan. Perhaps Budukhshan itself, and whatever lies on the left of the Punj or Upper Oxus, was formerly part of Khoorasan, while the country on the right was coarsely distinguished as that lying beyond the river (Mawaroolnahr.) But the usage of modern times is contrary to such an extension of the term, and restricts Khoorasan in this quarter nearly by the river Marghab. In Asia rivers seldom form boundaries, but rather are themselves considered as included in certain countries on both their banks, and thus Khoorasan may be allowed to comprehend a certain distance to its right, especially during its upper course. From where that stream empties itself into the Oxus, the Oxus is perhaps for a certain distance the boundary of Toorkistan to the north and Khoorasan to the south. In truth both banks of that great river, but especially the left, are here so barren, that limits are little regarded or understood. Towards the mouth of the river, Toorkistan extends considerably to the left of it, unless we consider Khwaruzm as distinct from either division.

5. The term Toorkistan in its present sense is but modern, and liable to some ambiguity. It may be said to contain the following provinces—

1st, The ancient Khwaruzm, lying towards the mouth of the Oxus chiefly, if not entirely to its left, and the Toorkman deserts extending from it towards the Caspian. 2nd, The tract we have just excluded from the modern Khoorasan, but not including Budukhshan. The natives having no appropriate name for it, I propose to distinguish it by its ancient one of Bactria. 3rd, The tract lying between the Oxus and Jaxartes, with a small territory beyond the latter river. 4th, The country beyond the Jaxartes inhabited by the Kuzzkas to the west and Kirghizes to the east;—tribes but little advanced in society, or acquainted with agriculture. Beyond them to the north we come to the Russian dominions, and on the east the Chinese. A fifth tract to be called Chinese Toorkistan, and not to be included under the term of Toorkistan simply, is to be afterwards mentioned. These general terms will in the sequel be less used than others more particularly applicable to countries of far inferior extent; but preparatory to the enumeration of these, let us sketch the course of the mountains and hills, which chiefly mark out their boundaries and give them their character.

6. The first and greatest ridge is that which forms the boundary to the north of Afghanistan. It originates however near the right of the Burmhpootr river, and running thence in a westerly and northerly direction, forms a boundary of the plains of Hindoostan and the Punjub, which are watered by the streams that either originate in it or the lofty lands beyond it. Within it is contained the fertile valley of Kushmeer, and beyond Kushmeer it forms the lofty tract called Little Tibet, and bounds to the north Pukhlee, into which it seems to send a branch. Crossing the Indus it has no longer the same tendency to the north of west, but running in nearly 35° 25′ north latitude separates Bhooner, Swad, and Punjkora, small districts now occupied by the Yoosufzyes, and into which its branches extend from Kashkar to the north. Arrived at the river commonly called from this last country, as originating in it, its greatest ridge appears to stretch in a direction to the south of west to a termination in the mountain Hindookoosh, but one minor ridge is detached along the left of the Kashkar river, which it divides from Bajaur to the Punjkora, while others on the right of that river form in their course the cragged country of the Kafeis, (but the Kafeis have some other portions of those mountains, and overhang the low valley of Lughuran. This grand chain has as a whole no acknowledged name among the natives, nor have the European authors yet agreed in one denomination to be given it. It is undoubtedly very lofty, not merely in its central ridge but in most of its lateral branches;

towards Afghanistan this height is usually gained very rapidly, so that not unfrequently low and hot valleys and plains lie at the foot of mountains white with perennial snow.

7. In the opposite quarter they do not preserve one character; Hindookoosh has a rapid descent into Budukhshan, which it divides from the valley of Cabul; more to the east there issues from the great northern ridge another, by geographers named Belur, a term corrupted from the Toorkee word Beloot, signifying a cloud, and which runs perhaps due north and divides Budukhshan, Durwaz, and Kuralegin on the west, from Kashkar on the east. Into all those countries, and beyond them into Toorkistan between the Oxus and Jaxartes, it sends branches generally of considerable height; but according to Lieut. Macartney it cannot be considered as extending beyond the river Jaxartes, which rises in its northern extremity not far from the farthest sources of the Oxus. The Kashkar river too seems to originate in the same neighbourhood but to the east of this range, along the foot of which it generally runs, and by which it is prevented running westwards towards the Caspian. To the left chiefly, or to the east of this river, is the country of Kashkar, which has on the south the great northern chain, so called as lying to the north of Afghanistan. This chain has here a moderate descent, and Kashkar appears to be generally speaking an high plain, which is as it were, supported by it. Many points however remain very obscure. Lieut. Macartney is of opinion that this high plain of Kashkar is surmounted to the north or north-east by another chain of mountains nearly parallel to the first, and in which originate, or partly originate, the Indus and the Kashkar river; and that these mountains in their north-western extremity join the northern extremity of the Belur chain. With respect to this other range which meets the Belur, it seems rather a slight height of land than a lofty ridge, and there is no absurdity in supposing it lower than the ridge first mentioned, though the streams generated in it pierce that ridge. In short, it seems probable that the table land is continued from Tibet as well as the mountains, and this table land naturally has a ridge from which the waters are turned contrary ways, but which need not be supposed lofty above its base. Certain it is that after entering Kashkar travellers from Peshawur to Yarkund, whose course is not very different from due north, have no very high mountains to pass. It is true Kashkar is not destitute of other mountains besides those bounding it to the south and west, but they do not appear to give a character to the country. The north-west part of this table land which lies north of

Kashkar is remarkable for its uniformity and levelness. It is named Pamer, which in the Toorkee of Yarkund signifies "the plain." It appears to be drained west, and probably into the Jaxartes chiefly. The road to Yarkund extends across it for about 60 miles or less, but in length it is said to be double. It is bounded to the south-west by the mountains above Keerategin, and to the north-west by those near the heads of the Jaxartes. Both are of the Belur chain, which is in fact to be considered as the steep termination of that broad upland tract which extends from the longitude of 69° to that of 93° east.

8. In this view of the subject Hindookoosh would be considered as a branch sent from this broad tract still further west. This lofty mountain has also its inferior branches spreading in many directions. A very considerable branch appears to extend from the Belur where in its greatest height it gives source to the Oxus and Jaxartes, and proceeding first west and afterwards south-west, separates Keerategin, Wukheeka, and Durwuz, which are drained into the upper Oxus, from Kohun and other places drained into the Jaxartes, as also from some part of the middle of Toorkistan, the waters of which hold their course to the Oxus in its inferior progress. I presume that all the hills of Toorkistan between those great rivers are to be traced to the Belur. That inferior range only called Aktaw, and which lies between Samarkand and the Jaxartes, seems distinct and insulated. With respect to the hills in the Kuzzak and Kirghiz countries beyond the Jaxartes, I know not what is their exact situation or direction. The former people indeed inhabit a tract generally level on the right of the lower Jaxartes. The Kirghizes pasture the Pamer, but have lower and more hilly grounds to the north-west. Geographers mention under the name of Alak, a range which joins to the Belur and continues in the same direction, that is towards the north, dividing the great and little Bucharias of some authors, here called independent and Chinese Toorkistan. Between Hokun, a city to the left of the Jaxartes in its upper course, and Yarkund in Chinese Toorkistan, one route at least leads over a high mountain, and in the latter country all the waters run to easterly instead of westerly points. The Alak range contains some of the sources of the Jaxartes, and in a higher latitude is said to originate the Neelum which, like the Jaxartes, runs to a westerly point. On the other side arises the Kizlsoo, or river of Kashghur and Yarkund, which, however, seems to be fed also from the grand tract of uplands already mentioned to the south, and from a chain of mountains far to the north, which geographers lay down from east to west and call the Altaian chain. Their latitude may be supposed to be 46°,

and that of Yarkund being by Lieutenant Macartney's construction 40° 30', the medium breadth of Chinese Toorkistan will be at least 400 English miles. Beyond the Altaian chain the waters run north into Siberia and the Frozen ocean. All those of Chinese Toorkistan are lost in itself or in the country immediately to the east (which is also subject to China); to this quarter alone does it slope, while in all others it is bounded by land much higher. Thus false is the common opinion of its forming part of what has been called the table land of Asia; the climate alone is sufficient to convince us of the contrary. Though in a higher latitude than any part of Tibet, the climate is much warmer, a fact we need not be surprized at, since we are informed by merchants who have travelled through great Tibet from Kushmeer to Yarkund that at a certain distance beyond Ludakh begins a descent to Yarkund.

9. There prevails in Europe, or did prevail, an opinion that the Caucasian mountains extend uninterruptedly on the south of Geelan and Mazunduran, and through Khoorasan to a junction with the Hindookoosh. It is highly probable the continuity is not broken until we reach a certain distance into the last country, but afterwards we find for a considerable distance only detached hills, seldom of very considerable altitude; or if there be any chain, or chain of hillocks dividing the rain water and the spring torrents, giving source to no rivers. To treat such as a continuation of Caucasus and Hindookoosh is a manifest abuse of terms. It is moreover aiming at a simplicity of arrangement which is excessive, and tends to darken the subject, not to elucidate it; for by such modes of reasoning ranges might be easily traced from any point, and all the hills and mountains of a continent proved to form parts of one range or of its branches. When generalizations so forced are made, nothing can be affirmed or denied of the whole which shall not be untrue of a considerable number of the facts; and recourse must at length be had to sub-divisions of moderate comprehension, which alone conduce to brevity, perspicuity, and the easy development of facts.

10. There even occur cases where though a connection must be allowed to exist, such is the dissimilarity of character in mountains, that they cannot conveniently be made to pass under one name, or treated of except separately; such is that of a chain which though it have no connection with Caucasus, has an undoubted one with Hindookoosh. We have seen that this famous mountain lies nearly due north of Cabul; but in a west or north-west direction from the valley, the roads to Toorkistan lead over a mountain which the natives

frequently call by the same name, and which is undoubtedly connected with it. The course of the mountains thus appears to change from west to south-west, and thence to almost due south, giving rise in that quarter to the Helbund, the greatest river of Khoorasan. The future course of the central and chief ridge it is difficult to ascertain with much minuteness, but its general course seems to be almost due west to the longitude of Hirat. The branches are numerous and extend to considerable distances, being visible from Candahar, and approaching still nearer to Mimuna, Undkho, and Bulkh in the northern directions. These are the mountains which the ancients seem generally to have distinguished by the name Paraparnisan. I say generally, because doubtless quotations might be brought forward in which the term is applied to others. Disregarding such instances, I propose to restrict the term to this range. The Paraparnisan is not so lofty as the great northern chain. Except the mountain called Shadeean, from a village of that name at its foot in the environs of Bulkh, I know no well-ascertained instance of continued snow on any one of them, though it is possible several such exist. They also rise more gradually from their bases than the other chain. Their abruptest descent seems towards Bactria. At their commencement, where they form the tract inhabited by the Gavee Huzaras, they have on the east a gradual descent to the high valley of Cabul, but towards Bactria so rapid, that we soon arrive at climates considerably warmer than Cabul. The table land of Ghuznee, still more elevated than Cabul, bounds to the east the main body of the Paraparnisan which gradually rise from it; to the south-west and north-west the descent into Khoorasan is also in general gradual.

11. Within Afghanistan we have first to notice that range which runs for the most part in latitude 34°. It is difficult to name with much accuracy its commencement to the west. The road from Cabul to south-west passes over no hill; to the eastward, however, of that line we find the valley of Cabul divided from the country to the south by the low ridge of Logur, which still more to the east rises into lofty mountains; these continue to the Indus, holding their course somewhat to the south of east. They even cross the Indus into the district of Attoc and divide (though not accurately) Chhuchh from the Khatirs. Even the hill of Husunubdal from its position and its composition almost seems a detached part of this range, which is of various altitude from the hills of the Khuttuks, seldom sprinkled with snow, to the white mountain, south of Jellalabad, ever crowned with it. The greatest altitude is about the middle, the least to the

east in this range, which is far narrower than the great northern one, is generally much lower, and supports no considerable table land; one corner it is true of the table land of Ghuznee rests on it. From this quarter (the west) the acclivity is gradual, but in most others it is rapid. The white mountain high in itself, appears still higher from its vicinity to the low lands of Jellalabad, whence it rapidly rises. The eastern hills also though so much inferior in height are usually steep, and not easily practicable. The valleys within this range are in general narrow. From its southern side, and east of Jellalabad, it sends off one or more branches to the north-east, in the direction of Swad. This minor range which though low is difficult, forms the boundary to the north-west part of the valley of Peshawur, and all the roads leading thence to Cabul pass through it; where it unites with the great range, it is called Khybur, and the constant inhabitants are chiefly of the Upper Mihmund tribe. To the north-east, in its further progress, succeeds the Ootman-Khel tribe, and here seems to be the greatest height.

12. None of its other branches deserve notice except what may be called the salt range, which proceeds from its southern side in nearly the longitude where commences the preceding, and holds a course to the south-east. At its junction it is inhabited by the Oorukzyes. At a short distance further it forms the country of Upper Bungush, and afterwards continues to Kalabagh on the Indus, and beyond that river to the vicinity of Pind-Dadun Khan, on the right of the Vehut. Its greatest height is at its commencement, but even there it is not very great. In some places it is easily practicable, in others not.

13. Another range runs nearly parallel to that of 34° in the medium latitude of 32½°. Eastward it may be said to begin at the Pezoo pass, and westward it seems to end near Mookr. It supports the south-east corner of the table land of Ghuznee, and in that quarter is of gradual acclivity and a tame character, although the absolute height be considerable. To the east it is more rugged. In height this range on the whole yield to that of 34°, for it contains no mountain which bears snow throughout the summer; the eastern part however does not diminish to that lowness which the eastern part does of the range of 34°. I know of no considerable height it sends off, but we are not to forget that short range which appears to unite its western extremity with that of the range of 34°. It is the eastern buttress of the table land of Ghuznee to which it has a gradual declivity, while to the east it descends with the utmost abruptness, forming a very difficult country, in which live some tribes who quite set at naught the royal authority;

the Jadrans are the chief, and from them those mountains may with propriety be named. They are of a height on the whole not superior to the range of 32½°, unless the lofty mountain Bunseekun be considered as part of them. It lies towards their northern extremity, and is covered with perpetual snow. The longitude of the Jadran range is, by Lieut. Macartney's calculation, about 69½°.

14. The southern part of Afghanistan is in all things far more obscure to us than the northern, but chiefly we are ill informed respecting the conformation of the country. It is neither well peopled nor much civilized, nor frequently traversed. It appears to be neither mountainous nor plain, but diversified with numerous small and tame-featured hills. Such a country is naturally in a warm climate but little productive. It certainly contains no mountain on which the snow does not melt before midsummer. The highest is the famous Tukhti Sooleman, called by the Afghans Kuseghur, which rising boldly from the low plain, right of the Indus, appears to the stranger a most conspicuous object, but is certainly far less elevated than the white mountain. From it proceeds a range of mountains in a direction parallel to the Indus, even somewhat beyond the most southern limits of Afghanistan. Their height is but moderate. I know not whether we can trace hills proceeding northwards from the Tukhti Sooleman and bounding Mukulwad and the Daman to the west, or whether the hills which appear from Dera Ismael Khan in that quarter be merely the ends of ridges running east and west, and among others of that of 32½°. Somewhat more to the north, however, begin some hills which extend for about 30 miles nearly parallel to the Indus, ending at the right bank of the Koorm. Those hills form a double range, and between is a sandy and barren valley known in the neighbourhood under the name of Largee. It is plainly formed from the ruins of these hills which are low and friable. The most eastern range closely hems in the Indus, and little arable land is left between, yet here live the Khusor tribe of Afghans, while the western range belongs to the Murwuts. The Khusor and Murwut hills are not properly comprehended in the southern Afghanistan, which may be considered as having for its northern boundary the range of 32¼° or the river Gomul, or the 32nd degree of north latitude. The other hills of this tract need be but little expatiated on. The country slopes east towards the Indus, south into Bulochistan, and west into the Afghan Khoorasan, or country of the Dooranees. but it is difficult to assign the boundaries of those natural divisions, The western part, inhabited chiefly by the Kakur tribe of Afghans,

is more elevated than the eastern, where live the Sheeranees, Lohanees, Oosturanees, and others, but these hills do not rise to a great height. We need not except even the hill Toba, lying 90 miles to the south-east of Candahar, which is now famous from having been during the last years of Ahmed Shah's life the cool summer retreat of that monarch.

15. Bulochistan is in general a flat and arid country, yet is not destitute of hills. We may trace a low range from near Sihwan, in a direction somewhat to the west of south and parallel to the Indus, almost to the sea-shore. At Sihwan it appears to change its direction, and instead of proceeding north to a junction with the Soolemanee* range, as represented in former maps, passes north-west, and ends some stage short of Jellalabad of Seestan. On this range is situated Kilat, nearly where it is highest. The mountain called Maran, which lies two days north of that place, is the only one in the range which bears perpetual snow. By this range Seeweestan is separated from that tract to the south-west inhabited by roving tribes of the Rinds in which Kirachee is situated, and the roads are said to be difficult. Towards its termination to the north-west this range seems to connect itself with the hills of the Kakurs; there are other hills in Bulochistan which however seem irreducible to any chain. Kilat and whatever lies west of Seeweestan is commonly reckoned part of the geographical division of Khoorasan. Kirachee is perhaps part of Hindoostan, and Seeweestan certainly is. Sindh is a champaign country. Bhukhur however is situated on a low hill or rock insulated by the Indus, but which must be considered as a prolongation of a low range which runs from the left bank of the river in a south direction diagonally into the desert, ending in the space of 30 miles. Jesulmer in the centre of the Indian desert, is built on an insulated low hill. The country of Kuchh which lies between the desert and the Indian ocean is a hilly one.

16. We have seen that the range of 34° and the salt range cross the Indus into the Doab of the Vehut and Indus. This Doab has also branches from the great northern range which run in directions very far from parallel to the preceding. The most remarkable is that which separates Chhuchh Hazara, the Khatirs, and other districts on the west and north-west, from Pothwar on the east and south-east. Towards the commencement of the range live the Gukhurs, a tribe which has been famous in history. Here is the chief elevation, which is but moderate. This Doab has also solitary hills or small ranges, not clearly derivable from any of the above-mentioned chains. The shape

* I use the term as our geographers seem to do, the natives employ it seldom, and give it a wider application.

and conformation of the country is thus very irregular, and the natural character of the portions very various. The hills and ranges (if indeed any there be) of Seestan and of all parts of Khoorasan are equally irregularly disposed, and cannot in writing be brought clearly before the mind. Few indeed rise to a considerable height.

17. Having concluded our sketch of the ranges of mountains, we now proceed to enumerate the various natural divisions thus formed and marked out. Some have been already mentioned, Kashkar lies north of the great northern range and east of the Belur; to its east is the country of little Tibet. Both are lofty and cold countries, and both seem to be more plain to the north and more mountainous to the south. The Upper Indus is perhaps the boundary. Little Tibet, or a part of it, is by some called Balteestan, from Baltee a Moosulman tribe inhabiting it, but the majority of the people seem to be in little Tibet of the system of religion known in the great Tibet lying to the east of Kushmeer. Little Tibet and Kashkar are as yet independent of the Emperor of China, who never entered them or sent his troops thither, still less has he ever threatened Budukhshan; but part at least of the Pamer is annexed to the Chinese Toorkistan. This extensive country is formed by the northern slope of the great upland track already mentioned (7, 8.) and by the tracts to the north as far as the Altaian chain (8,). Its eastern boundary is unascertained, and probably very uncertain, or marked by desert tracts. Although the whole be firmly attached to the Chinese empire, of which it forms the most western province, it is not under one governor, but many, who seem to be dependent only on the court of Pekin. We may distinguish Kashghur and Yarkund in the south-western angle, Aksoo to the NNE., Ela and Toorfan in the NE. and Khootun (which is not a city, but a country containing seven, towns) in the centre. The great majority of the people are of the Toork race, and hence I have called it Chinese Toorkistan. To the north, however, are tribes of pasturing Calmucs; and perhaps this vast province contains some part of the Kobee nation, which although its chief seat be to the east, in the wastes called the desert of Kobee or Sham, yet spreads west into Kashkar, and constitutes the chief population on the banks of the Kashkar river. On the course of this river we find four principalities, and in all, the chiefs are of this race; the highest is the most powerful, and extends his dominion to the right of the Indus, and the mountains north of Swad. These particulars are here the less misplaced, that the countries in question have ever been among the obscurest in Asia, and even the latest inquiries have

but little elucidated them. In future they will be but seldom mentioned.

18. We have already seen that the Belur and Alak chains divide the Chinese from the independent Toorkistan, which stretches thence west to the Caspian, and its three natural divisions into Toorkistan; this side the Oxus. Toorkistan, between the Oxus and Jaxartes, has been mentioned. The boundaries of the last division to the north, where it touches the Russian empire, are supposed to be defined by no great river or mountainous chain or other natural line. Geographers name minor ranges of hills in this division, but it is certain the far greater part is occupied by plains. This is still more true of its western than its eastern parts, and the former in consequence is scarcely an agricultural country, while in the latter we find the greater part of the dominions of the civilized state of Tashkund, and part of that of Kokun, but the capital of that principality and the greater part of the dominions lie in the middle division of Toorkistan. The east of this division contains in addition to Kokun, Keerategen, Wukheet a part of Durwaz, and nearly the whole of Hissar, with some other petty states. All these are hilly countries, and with the exception of the last, they may all be called mountainous; the valleys are of various widths, but generally narrow, and the road from one to another difficult. Durwaz is particularly narrow and impracticable; it lies on the Punj or Upper Oxus, and its princes were of a race which claimed descent from Alexander the Great. By late accounts, the living representative has been expelled by the Keerategenees.* In the west of this middle division we find Shuhr Subz, an inconsiderable state, and the dominions of Bokhara, which is the most powerful state in Toorkistan. The mountains of the east enter this tract, but diminish in their progress, and at length disappear. The west is therefore an open plain with the exception of the district of Nooruta, in which we find the Akhtan hills. These are of moderate height, although the name would lead us to judge otherwise. The highest of the whole has no snow beyond the middle of April. The extent of the range is not great, and no stream originates in it. The parts of this division of Toorkistan which border on the Aral lake, or sea to the west, are flat, sandy, and uncultivated; and the like is true of the opposite tracts beyond the Jaxartes and of those beyond the Oxus, with the exception of Khwaruzm. This was in ancient times the centre of a powerful kingdom, but now its weight is but small; its

* Not expelled, but deprived of part of his dominions (December 12th).

foreign dependencies have passed into other hands; the blowing of the sands have submerged part of its territory, and the productiveness of the remainder been lessened by the change artificially made in the course of the river Oxus. Mr. Pinkerton has expressed his scepticism in regard to the fact, and it may well be questioned whether the whole of this river was on that occasion turned; but the learned in the history of Toorkistan assure us that in the — century, the Calmucs did divert a great stream which passed west through the kingdom of Khwaruzm, and made it to run where now runs the Oxus into the lake of Aral. Khwaruzm still has its stream artificially drawn from the Oxus, and which is indispensable to its cultivation and existence. At no great distance from the river commence deserts, which extend to the Caspian, and are traversed by the pasturing tribes of Toorkmans (who moreover possess the sandy banks of the Oxus from Kelif downwards) and some other tribes. The chief city of Khwaruzm is Oorgunj.

19. Bactria, the only remaining part of Toorkistan, lies on the left of the Oxus during its middle course. It is now distinguished into several sub-divisions according to the remarkable cities and the existing distribution of dominion. Beginning from the quarter of Khoorasan, first occurs on this side the Murghab Kuburmach of the Jumsheedees, which tribe however living chiefly on the left of the Murghab for this and other reasons (4) we must assign it to Khoorasan. From Kuburmach proceeding in a direction not much different from ENE. we come at the distance of 30, 56, 20, 24, miles to Mymuna, Undkho, Shibirghan, and Bulkh, capitals of little states now independent. The traveller has to his right branches of the Paraparnisan, which are generally visible; he pursues his journey in a cultivated or cultivatable country, but beyond it to his left begin sands which continue to the Oxus. That river here holding a course to the north of west while his course is to the north of east, and the cultivatable country being usually of an equal breadth, the tract of sands beyond it is necessarily widest to the west. With Bulkh begins a country of a different character; the Paraparnisan still lies to the south, but the Gavee Paraparnisan, moreover, to the south-east, intervenes between this country and Cabul; and to the east, towards Budukhshan, are branches from the Hindookoosh. Hence is this tract very diversified, and while the south and east are generally hilly or mountainous, the north and west are generally level. Bulkh is itself level, but has dependencies among the valleys of the Paraparnisan to the south. From Bulkh, one very long day's journey of that quarter to the east or south-east,

lies Khoollum, which to the east rises into hills and mountains; this place is subject to Bulkh, the chief of which extends his dominion to within two days of Bamian, where begins the government of the Afghans. The intermediate country is hilly and poor. The chief of Bulkh has influence in the remaining part of Bactria, which lies to the east. Talikan alone is a hostile state, and is independent. Its hills are however less lofty and difficult than those of Ghoree and Khost to the south. Between Ghoree and Khost is Undurab, which is also mountainous. Koonduz lies to the north-west of those places, being in the road between Bulkh and Talikan, four days from the former and one from the latter. It is a level and fertile tract. If to these we add Huzrut Imam, situated thirty-five miles below the junction of the river Koocha with the Oxus and under Hissar, already mentioned as a state beyond the Oxus, we have enumerated the chief remarkable districts in Bactria.

20. The river Koocha in its upper course intersects Budukhshan in its lower boundary, the eastern and southern boundaries have been already mentioned. Its northern limits are more difficult to assign. The natives seem at present to restrict it to the country politically under the chief of Fyzabad (who is a Syyud and is stiled Shah) which many consider as a convertible term for Budukhshan; it is situated on the left of the Koocha, five days east of Talikan. It is not easy to discover what extent the majority of European geographers wish to give to Budukhshan, but there seems little or no authority for extending it beyond the river Oxus, and it seems convenient to have a general term for the tract of country which the upper course of that river bounds. It is a diversified country, but its general character is ruggedness and poverty. The valleys are narrow, the mountains steep, the streams rapid;—by far the greater part is subject to Fyzabad. To the north beyond the river are Durwaz, Wukheeha and Keerategin already mentioned, and whose natural character is very similar.

21. The Gavee mountains which have been shewn to connect the Hindookoosh with the great body of the Paraparnisan, divide Bactria on the north-west, from Cabul on the south-east. One of the most frequented roads passes through Bamian and Goorbund, which are narrow tracts. The delightful valley of Cabul is open only to the south, where some inconsiderable heights divide it from the table land of Ghuznee, which here inclines to it. Cabul is politically divided into four tuppas or districts, Logur to the south, Kodamun to the north-west Pughman to the west, and Bhootkhah to the east. To the north and north-west is what is called the Kohistan or highlands of Cabul, in

which the chief valley is that of Punjsher; Ghoshund and Bamian are not included in this term, and lie more to the west within the skirts of the Paraparnisan. East of the valley of Cabul, after a considerable descent, we arrive at the country of Lughman, lying low, under lofty branches of the great northern chain. It is situated to the north or left of the Cabul river, is on the right in the most frequented roads from Peshawur to Cabul, and is of an extent far inferior to that of the valley of Cabul. To the south-east it borders on Jellalabad, a city and district on the right of the Cabul river, diversified with mountains, hills, and plains; its plain is somewhat less spacious than that of Lughman. The city of Jellalabad is passed in all the roads from Peshawur to Cabul, between which places it is nearly intermediate. To the south is the White mountain, the loftiest of the range of 34° north, and north-east of Jellalabad beyond the Cabul river is the narrow valley of Koonur, lying on the left of the Kashkar river, which joins that of Cabul opposite Jellalabad. To the west of Koonur lies Lughman.

22. In the enumeration of the chains of mountains, have been already mentioned a branch proceeding from the great northern mountains along the left of the Kashkar river (6) and a branch or branches leaving the range of 34° to the east of Jellalabad, and running in a north-east direction (11). The detached branches of these appear to unite, and together they divide the various districts already mentioned, from the greatest of the plains, which are situated between the great northern and the 34° chain of mountains. This great plain lies from the foregoing in easterly directions. Although there be no complete interruption to the continuity of this plain, yet do the strait roads between its detached portions sometimes pass over branches from the mountains which bound the whole; that between Peshawur and Bajour conducts north-west, through the Mikmund or Ootman hills (11); we may therefore distinguish Bajour, with the adjoining districts of Punjkera, from the remainder of this great plain which may be called from Peshawur the greatest city it contains. Bajour is peopled by the Purkulanee tribe of Afghans, who are not a part of the Yoosufzyes as supposed by Major Rennel. The chief inhabitants of Koonur are the Degans, who here speak a peculiar tongue. Punjkora is so called as being peopled by five houses or branches of a subdivision of the Yoosufzyes. The plain of Peshawur after those reductions is still comparatively spacious in a country so mountainous as Afghanistan. To the north it has the great northern range, which sends branches into it, forming the upper parts of Swad and Bhooner, while

the lower are level; to the south it has the range of 34°; and to the east the Indus. Its western boundary has been already detailed. The Yoosufzyes are a numerous tribe, who disregard the royal authority.

23. South of Cabul is the table land of Ghuznee, the boundaries of which to the east, north, and west, have been already mentioned. To the south or south-west it slopes into Khoorasan. It is far from being a perfect plain, having many slight inequalities. Proceeding eastward, we find the Jajee valley, that of the Torees, and others proceeding from the south side of the range of 34°, and some of less note which penetrate into that of 32° and the Jadran range. At a considerable distance to the south-east is the valley of Bunnoo, situated between the salt range, and the range of 32½° towards its eastern extremity. It is of an extent far inferior to that of Peshawur. A branch of the salt range divides it from the narrow territory peopled by the Eesa Khel tribe and others to the north-east. It lies on the right of the Indus, and terminates to the north, where that river is closely hemmed in at Kalabagh by the hills. These hills divide it to the north-west from Malgeen, as they divide Malgeen on the north from Bunnoo on the south. Kohat lies still more to the north under the range of 34°, and to the west it has Upper Bungeish, a hilly tract. Both Malgeen and Kohat are diversified moreover with very low hills, which seem generally to be from east to west. Neither are spacious.

24. The Eesa Khel plain is bounded to the south by the river Koorm. Beyond that river seems to begin what is by the natives called Daman, a term strictly meaning the lands at the foot of a range of mountains or hills; in this instance it has perhaps a more general meaning, and includes even some low hills of this quarter. It ends to the south at Sunghur, where begins Sindh. Like most other terms partly descriptive partly arbitrary, it is not by all used in the same latitude, and it seems doubtful whether we are to include in it that tract in which is situated Dera Ismael Khan, and which the natives call Mukulwad. It lies on the right of the Indus, which bounds it to the east. The hills are here at a considerable distance from the river, but both to north and south they approach nearer it. The Dawan most strictly so called, lies west from Mukulwad. I know not whether it be considered as extending to the south, between Upper Sindh and the Sooleemanee hills (see Para. 14.)

25. There being little to add respecting the southern parts of Afghanistan not comprehended in Khoorasan, we may proceed to Sindh

beginning as before mentioned at Sunghur, a place lying in north latitude 30° 40′, and east longitude 70° 45′. The term Sindh seems to have been originally descriptive; Sindh in the ancient Hinduwee signified ocean, or great river. The people inhabiting the borders of the Indus in process of time applied it to that river as being the greatest and most important; they knew rivers are in all countries great features of a country, but chiefly where it is low and champaign; we need not therefore be surprized if in such cases the tracts lying along the various rivers be named after them. This practice has probably been more general in former times, before foreign conquest introduced new and arbitrary terms, and fiscal or political divisions were adopted, little coincident with natural ones; the last, however, are those chiefly recognized by the cultivators, and various instances still remain to exemplify the principle just mentioned. Were it applied in strictness, Sindh would include all the country at a moderate distance from the river Indus, from its exit from the great northern mountains to the sea. In modern times at least other distinctions have quite superseded the term, if ever applied to the upper course of the Indus. It still remains applicable to the lower, during which it is that this great river is of most importance to the subsistence and comforts of the inhabitants. From Sunghur to the sea, the low fertile country to the right of the Indus is named Sindh; whether on the left bank of the river it ascends to the same latitude seems doubtful. On the one hand Buhawulpoor on the Ghara, at a considerable distance from the Indus, is considered as comprised in Sindh; on the other, Mooltan cannot be denied to lie in the Punjab. Leaving this in uncertainty, we may remark, that from Sunghur to the sea are three natural divisions. 1st. The most northerly in which lies Dera Ghazee Khan, and which may be called Upper Sindh, it may be said to end with the Sooleemanee hills. 2nd. The middle division, comprizing the country of the Muzarees, who are independent Beeloches, and south of them the district of Shickarpoor. 3rd. The most southerly, now under the government of chiefs of the Talpoora tribe—this may be called Nether Sindh. To this alone it is that in our maps is given the name of Sindh or Sindhee, but all authority of native writers or native use is against this restriction, which if persevered in, must give rise in our dealings with the people of the country to frequent mistake. Sindh is a narrow champaign country. Its greatest width is in the middle division, and near the sea where the Indus forms a delta. The length may be 400 English miles and the average breadth 50. To the south is the Indian ocean, to the east is the great Indian desert, and

beyond it the Rajpoot states. The country of Kuchh extends from the most southern part of Sindh, in an eastern direction, towards Goojrat. It lies along the Indian ocean, and the name seems originally to have implied 'border or edge', but as the lands bordering rivers are usually low, Kuchh, Kuchhee, and other words from that root seem now in numerous cases to mean low and moist lands near rivers. To the north, Sindh has Mukulwad, the Daman, and the Punjab.

26. West of Sindh lies Bulochistan, there is here however a tract of country which is to be distinguished from both; if included in Bulochistan, it would form its north-east corner, and it lies west of the middle and of part of the upper Sindh; Aboolfuzl seems to have called it Seeweestan—a general term now little in use, but very convenient for us to retain. It contains Seewee, Gunduwah, Dhadur, Laree Bhag, Naree, perhaps Hurnd and Dhajul, and some other towns and districts. It is itself a plain, but has in most quarters low hills for boundaries. A hilly but by no means mountainous tract intervenes between it and Candahar, and in that tract live the Tureens and some other Afghan tribes, while to the traveller's right hand are the Hakurs. At Gunduwah begin hills, and the country is hilly to Kelat, a distance of 120 miles in a direction about north-west. Kelat must be considered as the capital of Bulochistan, though not the greatest city. The surrounding country is but poor. In the western part of Bulochistan are the cities, towns, or districts, of Keech Mikran, Punjgoor, Dezuk, Bempoor, and others; this last is nearly SSW. of Jellalabad, the capital of Seestan, from which it is distant 13 days journey. Of these the three only nearest to Jellalabad are inhabited when the direct road is chosen, but it is said there is a road more to the east which conducts through a country generally inhabited. From Bempoor to the sea it is said to be ten days, and to the first town in Kirman five days. In both cases the country is reported to be inhabited. On the coast of Bulochistan are some harbours of which the most noted is Kirachee, the longitude of which is not very different from that of Kelat. Nearly intermediate between them is Belo. The information is very scanty which is to be gained concerning Bulochistan, a circumstance which perhaps evinces it to be a country little productive or practicable. The chief population of Seeweestan is Indian, but the Beeloches are generally speaking the masters of the country. They are themselves divided into two nations, which were probably distinct in early times. The Koorgal nation is the superior, and its residence is chiefly in the west, and in the hilly tract wherein is situated Kelat. The Rind tribes dwell in the eastern quarters,

and are also the chief population of the south-west, so that in numbers they exceed the other nation.

27. To the north of Seeweestan lie the countries of various Afghan tribes; to the north of the western part of Bulochistan lies the country of the Bureches, that of the Dooranees, and Seestan; but the country of the Dooranees stretches a considerable distance beyond in a north-westerly direction. All these are included in Khoorasan. From Candahar to Hirat is a distance of 300 miles from ESE. to WNW. On the traveller's right is the Paraparnisan range, on his left Seestan, of which the capital Jellalabad lies 150 miles west by south from Candahar. From Jellalabad nearly due west, at the distance of 190 miles, is Nih, which though under a separate government is perhaps to be considered as in Seestan. From Nih the country of Ghaeen and Birjund lies north, and is of considerable extent. It lies from Hirat south-west, and from Furah (a considerable place on the left of the road between Candahar and Hirat) west. From Ghaeen, north-west, are Toorshish and Mushhud, which last place lies from Hirat more in a westerly than northerly direction. The country of Khaf lies west of Hirat, and north-west of it, towards Mushhud, is that of Toorbut. Jam and Murv lie to the north. The Afghan dominions end a short distance to the west of Hirat. These divisions which have been enumerated are political ones. The face of the country is too little known, and even if known, is probably too irregular and diversified to be distributed into natural divisions of well marked characters. But the country of the Ymaks, lying to the east of Hirat, is distinguished from all the others as being decidedly hilly, though indeed it possesses some wide valleys and some plains contiguous to the hilly tracts. Of these last the chief is that which lies north from the hilly tracts, but forms part of the north-east boundary of Khoorasan, and in which is situated Huburmach, a place already mentioned. To prevent mistakes it may be observed, that though this tract in general may justly be called the country of the Ymaks, part of that nation is found at some distance from it.

28. We have now rapidly sketched the countries lying west of the Indus, or north of its sources, and proceed to those lying eastward of it. Little Tibet has been already mentioned. It seems to be a country not easily practicable, for we are informed, that the trade from Kushmeer to Yarkund once passed through it because of the road by great Tibet having been forbidden, and that this was considered as an inconvenience. It is certain, a strait line between Kushmeer and Yarkund would pass through the little rather than the great

Tibet, and hence the objections to the former road must have been to its difficulty rather than its circuitousness. Little knowledge is to be gained of either country, but they are known to be poor. Great Tibet extends far to the east from Kushmeer, while the little lies west of that country. Little Tibet is as yet quite independent, except that a few of the low situated villages are now subject to the governor of Kushmeer. South-west of little Tibet, on the banks of the upper Kishengunga, is the independent territory of the Durds, which is very little known.

29. The delightful valley of Kushmeer has already been accurately described by Forster. West of it lies the district of Moozufferabad, abounding in low hills, and beyond it is Pukhlee, which consists partly in hills of considerable height, and partly in a plain or valley lying on the left bank of the Indus. South of it is Chhuchh, and south-east Huzara, of which both are plains. The former lies opposite the lower part of the plain of Peshawur, while Pukhlee is opposite to Bhooner. South of Chhuchh is the country of the Khatirs, and beyond them that of the Uwans, Dhuns, Gheps, and other tribes. The eastern part of this Doab of the Indus and Vehut is chiefly occupied by Pothwar, a country now in subjection to the Sikhs, but the exact limits of which are not easily assigned. A range of hills divide it from Huzara and the Khatirs. This Doab, as before observed, has numerous hills, and though low, they are sometimes very difficult. Where they end to the south begins the country of Mohummud Khan of Lya, which is here sandy and approaching to a desert. This and the other tracts as far as the mouth of the Indus are sometimes known by the name of Lumha, which means in the local dialect, 'south.' The territories of Mohummud on this side the Indus consist of high sands more remote from the river, and a lower and more fertile tract by its banks. The former is named Thul, the latter Kuchhee, both descriptive terms. Of the Kuchhee the southern part at least must be considered as in Sindh. Towards the angle of this Doab to the south the Thul is lost, and all the lands are low, moist, and fertile.

30. The whole of this Doab of the Vehut and Indus has now no name in general use. That of Sindhsagur given it by Akbar, is known only to the readers of the Ayeen Akbery, nor are any of the names given by him to the Doabs of the Punjab in common use. It seems doubtful whether that of the Vehut and Indus is to be considered as part of the Punjab, which many consider as restricted to the space included between the Vehut and Sutluj. To the south-west it

draws to a point where the five rivers are assembled in one stream, and to the north-east it is bounded by the great northern mountains. Within these mountains are many independent states, and also some of the dependencies on Kushmeer, for instance Poonuch and Rajwer. From Jelum on the Vehut to Lodhiana on the Sutluj is about 250 miles of road distance. The Punjab thus restricted is a country universally plain. From Lodhiana to Delhi is 220 miles of road distance, through a flat country; at some distance to the traveller's left, or to the south-west, begins the great Indian desert, which extends to near the sea, dividing the lower Punjab and Sindh from the Rajpoot states. Of these we may mention Jodhpoor to the south, and Beekaneer more to the north. Bhutner lies at the northern extremity of the desert, in a country not naturally unfertile.

Rivers.

31. Of the rivers in these countries the greatest is the Indus, some have considered it as the boundary of Hindoostan to the west. Both now however, and formerly, we find the Hindee race and language far to the west of the Indus from its first exit from the great northern range to its falling into the sea. It must be considered an unnatural arrangement which should assign the eastern part of the narrow country of Sindh to India, and the western to Persia or Bulochistan. Other boundaries less simple and marked must therefore be sought for. By the inhabitants of Sindh this great stream seems best known under the name of the river. The Punjabees and people in general of the Hindee race distinguish it as the river Sindh; Persians and Khoorasanees either soften this into Sind, or name the river by the addition of some conspicuous town on its banks, a practice not unknown even to the inhabitants themselves, hence it is best known to many as the river of Attoc. The Afghans have called it 'Ubaseen,' that is father or venerable river; *seen* in their language signifying river. But if we trace upwards the stream thus distinguished by them, we shall find they have selected the lesser, instead of the greater and more remote branch. The Ubaseen of the Afghans rises in the southern face of the great northern chain only 120 miles in a NNE. direction from Attoc. About ninety miles from that place it falls into the true Indus, which comes more from the east. The course of the true Indus is but conjectural, but may be safely said to be long and its source remote, in the table land (see para. 7.) From where it leaves the lofty mountains to the sea it runs in a direction 24° west of south, and though it have many

windings, it takes few great sweeps. As far as Attoc it is a rapid river, but at Kalabagh, distant thence 80 miles, it is very slow and still; it is no longer confined on both sides by hills, though to its right are sometimes found hills, and assumes all the well known characters of a river flowing through a champaign country and yielding soil. At Kuheree after having been joined by all the waters of Afghanistan, it is in the ebb season about 1000 yards broad, and where deepest twenty-one feet deep, with a current of two and a half miles an hour. Not far from Mithundakot it receives from the left the Punjnud, in which are collected all the waters of the Punjab, but which is yet much inferior to the Indus. After this junction, that river probably exceeds the Oxus in quantity of water.

32. The Hydaspes is the most westerly of the five rivers of the Punjab. This name originally imposed by the Greeks, is an evident corruption from Vidusta or Velusta, its ancient name in the country, and which the natives of Kushmeer still retain; by the Punjabees it is called Vehut, which the people of our provinces change into Behut; strangers in general usually name it the river of Jelum, from a town of that name built on its left bank in north latitude 33°. Here is a famous ferry, and in the ebb season it may be forded, though with some difficulty. Here too the Punjab may be said to begin, for in the northerly directions are mountainous tracts. The Hydaspes rises in the valley of Kushmeer, and having a slow current in deep muddy banks, soon becomes navigable. Before leaving the valley it joins from the north the Lar river, so called as intersecting the district of that name. After leaving Kushmeer the Hydaspes becomes rapid and unnavigable. At Moozufferabad it receives from the right the Kishengunga, a far inferior stream rising in little Tibet. Various mountain torrents now add their waters, and arriving at Jelum it has gained almost its utmost size. Until it reaches Pind-Dadun Khan, it is at intervals confined by hills on its right; at Rusheedpoor it falls into the Acesines, and near Ahmedpoor the joint river receives the Hydraotes. The Acesines as being the largest and centrical gives its name to the three, which thus united in one stream pass Mooltan, lying about six miles from the left bank; and at Sheenee Bhukhuree, fifty-six miles from that place, is their conflux with the Ghura, which contains the two eastern rivers of the Punjab. The five rivers thus assembled are called Punjnud. The Punjnud had formerly but a short course before it joined the Indus, and perhaps the term was not then used; but in consequence of an extraordinary rise of the rivers about twenty years ago, their channels were changed, and the Punjnud now runs for about fifty-one

miles parallel with the Indus, which at length it joins opposite to Mithundakot.

33. The Acesines is certainly the largest river of the Punjab. In ancient times, as we are informed by Aboolfuzl, it was called Chunderbhaga, from its being formed of two mountain streams, Chunder and Bhaga. The name Sandabilis used by the latter writers on India among the ancients, seem derivable from Chunderbhaga, but the etymology of Acesines is now obscure. The inhabitants of its bank at this day though not ignorant of the ancient appellation use not it, but Chunkâ, which we and the Persians have changed to Chunab. This great river rises in Kishtwar, a dependency of Kushmeer. There is little reason to think that any of the rivers of the Punjab rises beyond the great mountains in the table land. The Acesines is forded with difficulty even in the ebb season. The Hydraotes was formerly, in the country, called Irawutee, and now Ravee. It is by far the least of the five rivers.

34. To it succeeds the Hyphasis, anciently called by the natives Bypasha, and now Beak or Beas, and lastly the Sutluj. The Sutluj was by the Greeks called Hesudrus. Its ancient name was Shutoodr, and in Peshawur it is to this day usually called Sutloodr; it is inferior to the Acesines, but seems equal to the Hydaspes; yet did the Greeks call the joint stream of the Hyphasis and Hesudrus by the name of the former, a much inferior stream. At present both names are lost, and the river formed of them near Feerozpoor is first called Neelee, and afterwards Ghara, or Ghuloo Ghara; it is no where fordable even in the ebb season, but both its branches are. We are informed by Aboolfuzl that in his time it separated into a number of branches at some distance below its formation. At present, although it have like other rivers of a champaign country small nullahs or branches, it no were sends off a considerable part of its waters. As before mentioned, it falls into the Acesines, nor is there any reason to think that when Major Rennell composed his map and memoir, it held a different course; yet has that excellent geographer rejected Arrian's authority for this fact, without assigning any reason.

35. Between the Jumna and Sutluj are various small streams, very important in a military point of view. The Kughur and some others fall into the Sursootee, a river the course of which has long been a problem. The late inquiries entirely confirm that account which is given in Franklin's life of George Thomas, by which it appears to be lost near Bhutner. There is however a tradition that in former times it passed to the south, and spread itself over the wide expanse of level hard clay in the centre and west of the great Indian desert.

36. By far the greatest tributary of the Indus from the right is the river running under Ukora and Noushuhra in the plain of Peshawur. Captain Wilford has called it the Lundkee Sindh, or little Sindh, a term partially used in the country; but it is to be regretted that in this as in very many other cases, rivers have no proper names as such, and distinct from the towns which may be on their banks. This river joins the Indus less than a mile above Attoc, but on the opposite side. It does not appear probable that it has ever passed under the name of the river of Attoc. Before the junction both rivers are fordable, but after it no longer so. The Indus is the larger in quantity of water as being more rapid, but the channels seem equal. The Ukora river drains a very extensive and various country. Its sources may be divided into western and northern. The most remote of the western are in the mountains which bound the valley of Cabul, which is watered by three principal streams. The least which rises to the south or south-western runs through the capital; there afterwards joins it another from Ghorbund, and still lower that of Punjsher, the largest of the three, and which rises in Hindookoosh; other small streams contribute their waters from the right and left, but the rapidity is such that with all these additions the river is not navigable even by rafts until it join the stream of Lughman, which rises in the Kaper mountains to the north, and intersects that province. Although probably inferior in quantity of water, a gentler current admits of navigation on it by rafts before the junction.

37. Five miles east of Jellalabad joins from the north the Kashkar river, which is a rapid stream, and supposed to contribute three times the quantity of water brought by the united rivers of Cabul and Lughman; for about fifty-four miles the navigation of the river formed of these three streams is interrupted by no obstacle, yet are boats used in one place only (Dhukka) and there for ferrying merely; for about thirty-two miles further, to Micknee, occur at intervals, rocks, whirlpools, and cataracts, which are reckoned up to the number of thirty-two. The river in this space pierces the secondary range of hills already mentioned (see para. 11.) A passage down the river is at no season impracticable on rafts, but it is safest in the flood season, for although the violence of the stream be then increased, greater depth of water removes all danger arising from many of the rocks. The upper Mihmunds who live chiefly on the left of the river along this dangerous tract, take advantage of the difficulties of the traveller to rob him or extort a ransom.

38. From Micknee to the Indus the river flows with a moderate

current through the valley of Peshawur, which it fertilizes. A short distance below Micknee it divides into two branches; the lesser, usually called the Shuhalum river from a village of that name, passes only four miles to the north of Peshawur. It unites twenty-five miles in a straight line from the point of division with the Hadezy or other branch, which had previously received from the north-east the river of Swad, inferior to itself. The river is now completely formed, and proceeds to the Indus a distance of thirty-five miles. It divides (though not exactly) the Yoosufzyes to the north from the Khutuks and other obedient tribes to the south. The Mihmudzy tribe inhabit chiefly the district of Hushtungur, lying on the left bank of the Swad river. In the Doab between it and the Hadezy live the Gugeeanees, and the upper Mihmunds and Ootman-Khel tribe bound them to the north and west. In the island of Hadezy and Shuhalum live the Daoodzyes; south of them and the Shuhalum are the Khuleels, who live chiefly to the west of Peshawur, and the lower Mihmunds who live chiefly to the east of it; to the east of them are the northern Khutuks. The people of the south of the plain draw but little water for irrigation from the river; their neighbourhood to Peshawur and the great road exposes them to oppression and military rapine. The canals which formerly existed are now in a state of complete or partial decay. The Boodhunee however which rises from springs in the plain is increased to twice its natural size by the introduction of water from the Shuhalum. The Bara is a more important stream, though in size very inconsiderable. It rises to the south-west in Teera, a well peopled district, situated high on the range of 34°, and diversified with hill and plain; whatever is suffered by the Afreedees, or people of that country, to flow to the plain, is by the government appropriated in the following manner—A certain quantity reckoned by the number of mills it can (if required) turn is taken for the use of the city and gardens of Peshawur. The remainder is to be equally divided between the lower Mihmunds and the Khuleels, but no rule has been established which does not give rise to unceasing jealousies and suspicions between these two parties, which often break forth into open war.

39. If computed from its western sources to its mouth, the general course of the Ukora river is a little to the south of east, according to the direction of the range of 34°, and in length, in a strait line, about 200 miles; but its greatest streams come from the north. The Kashkar river rises remote in the table land. Before piercing the great northern range it receives from the east the Sheesa, which rises

behind them, contrary to the Ubaseen. After crossing the line of the great northern range it still remains hemmed in by its branches (see para. 6) and continues to its mouth a rapid stream. It is navigable for rafts only as far as Asmar, seventy-five miles from its mouth; thence upwards it is exceedingly rocky. In the ebb season it is fordable by horsemen in various places, and in some, a party of men on foot, by joining hands, can with difficulty cross it. At Chughsuraee it receives from the right the stream of Pech, running in a valley of that name, through which leads a road north-west to Budukhshan. The other northern stream is that of Swad, which has a general course from the north-east. Arrived in the plains it is joined in the north-west by the inferior stream of Punjkora. They unite near Khizree Khel, forty miles from Peshawur.

40. The other additions to the Indus are but inconsiderable. Pukhlee and Bhooner have their rivulets and torrents, and in the former may be noticed the fern much used in agriculture. The Huro rising in the territory of the Gakhurs (see para. 16) intersects Huzara and part of Chhuchh, but leaving it falls into the Indus between Attoc and Neelab, in the country of the Khutuks. The Swan, a much superior stream, rises in the district of Moozufferabad, and passing through Pothwar and some other districts of that Doab joins the Indus some miles above Kalabagh. The To rising in upper Bungush and Teera, waters Kohat and falls into the Indus after a short course. Malgeen has its rivulet. Bunnoo is well watered by the Koorm. This river has very numerous sources draining the left of the salt range, part of the left of that of 34°, the Jadran range, and the right of that of 32½°. Perhaps the chief is that which is traced to the White mountain, in which case the Koorm has a course from north-west to south-east. Its greatest tributary is the Gumbeela, rising in the western part of the range of 32½°; even at its mouth the Koorm is but a small river, and probably discharges not more than a tenth of the water discharged by the Ukora river. Still less is the Gomul, whose course is near the south or right of the range of 32½°. It does not in ordinary times reach the Indus, but is expended in the agriculture of the Daman. After heavy rains however it exceeds the demands made on it, and spreads itself over the Daman and Mukulwad on its way to the Indus.

41. In Afghanistan, south of the Gomul, and in the whole of Bulochistan is no stream of magnitude or whose waters reach the sea; it is in like manner with the Persian Khoorasan; but in the Afghan Khoorasan are some considerable ones. The greatest is the Kelbund

which rises contrary to the Ghorbund stream. After running a considerable distance in the Huzara country it enters that of the Dooranees, and passes to the west of Girishk. It finally discharges itself into the lake of Seestan. It is a rapid river, especially during the first part of its course, and the quantity is certainly considerable in the summer, but Mr. Forster who passed it at Girishk on the 17th November, 1783, describes it, without naming it, as a small stream of good water. In the ebb season it is fordable in certain places, but in that of the floods must be passed by means of boats or by means of pumpkins. Except towards Seestan, where the bottom is composed of sand only, the channel has a mixture of stone and sand. The banks are generally high, and the river never sends natural branches to a considerable distance. Art however has drawn out some canals. The most famous is that made by the late Payenda Khan Barukzy, and lately repaired in the midst of civil broils by his son and successor Futteh Khan. It is drawn from the right of the river. The general course of the Helbund is about south-west.

42. Not far below Girishk it receives the Urghundab from the left. This stream is of far inferior magnitude, and in the ebb season is easily fordable in all places. It rises in the south-eastern extremities of the Paraparnisan, not far from Sooltan Safee, and has Candahar not far distant from its left bank. It is afterwards joined by the Turnuk, or rather by a part of that little stream, for another part is lost in sands. The Turnuk drains part of the Kakur country and of the table land of Ghuznee, and is reckoned to have its principal source near Mookr. Equal to the Urghundab is the Khashrood, that stream which runs under Dilaram to its right. It rises in the Paraparnisan chain, and after a course nearly south falls into the Helbund near Kohinsheen, three days journey below Girishk. The Furahrood, so called from Furah, which is situated on its left bank, also rises in the Paraparnisan, but from parts of it more westerly; it never joins the Helbund, but pursues a separate course into Seestan, where according to some accounts it gains the lake; but according to others, is in the ebb season at least lost in the sands. It is twice as large as the Khashrood, and its course seems to be south-east.

43. Such are the streams which take their rise in the south side of the Paraparnisan. From the west rises the river of Hirat, called by the people of Khoorasan 'Pool-i-Malan,' and by those of Toorkistan 'Tejun'; it is the Ochus of the ancients, and is said formerly to have reached the Caspian sea. At present it is lost in the desert south of the Oxus in a direction north-west of Hirat. It is twice crossed in

the ordinary road from Candahar through Hirat to Persia. Except in the season of rain it is very small, and much of its waters are expended in agriculture. The ancient Margus or modern Murghab, whose sources are not far distant from those of the Ochus, is perhaps of an equal size. It runs nearly due north, and after passing Muro, at some distance to its left, pursues a solitary course through sands to the Oxus, which it barely reaches. A considerable rivulet from the Paraparnisan, waters successively the districts of Mymuna and Undkho, but never gains the Oxus. Bulkh has eighteen streams, but of those some are canals drawn by art from natural ones, rising in the mountains to the south. None of them can aspire to the name of a river. That called the Bulkhab is the chief. Advancing eastward we come to the stream of Khoollum, and after it, that of Koonduz, which is more considerable, and composed of three principal branches draining Talikan, Ishkumish, and Ghoree. This last is the most to the west or left of the three. The middle one it is which is sometimes known by the name of Bungee. The river composed of these three streams is equal to the Swad, and pursues a north-westerly course to the Oxus.

44. That great river, according to information received by Lieut. Macartney, rises from a glacier of the Poosht-i-Khur, a lofty mountain of the Belur. The natives of the country content themselves with tracing it to Durwaz, and usually confess their ignorance of its earlier progress. The first considerable stream it receives is the Soorkhab, or river of Keerategin, it afterwards joins the Koocha from Budukhshan, and the Oxus now ceases to be fordable. From being very rapid and precipitous, it now gradually assumes the character of stillness, and gently glides over a sandy bed to the Aral lake, where it is lost. Besides the tributaries already mentioned, the Zurufshan, or river of Bokhara, joins it when flooded ; it has a south-westerly course. That of Keerategin runs nearly south, the Koocha north-west. The Zurufshan is but an inconsiderable stream in quantity of water, but is indispensible to the agriculture of Samarkand and Bokhara. The Oxus is by the natives of Toorkistan called Umoo, a name which strangers change to Hamoo ; but during its upper course among the mountains it is called Punj. Its course is not much to the north of west.

45. The extreme sources of the Jaxartes are not far distant from those of the Oxus, but it holds a more northerly course. Towards its mouth however it is said again to approach the Oxus, and according to some it actually joins it before it falls into the Aral. In size it is much inferior, although a considerable river. Its chief tributary is the Chilchik, which falls into it from the north-east, a few miles above

Tashkund. The Jaxartes is now called Sir or Seer, but the Arabian geographers name it Syhoon, and the Oxus, Jyhoon. In the winter it is to be crossed in some places on the ice, but in summer rafts are used. In the Oxus both rafts and boats are used. The practice with respect to both, and on both rivers, is to yoke to them the passenger's horses and cause them to transport them across by swimming. Of the Neelum we know only that it falls into the lake of Aral, and comes from an easterly point.

46. Nor is our knowledge much more detailed of the streams of Chinese Toorkistan. All of them seem to be collected in one river, ultimately lost in a lake beyond Toorfan. Even this river is not reported to be of very great magnitude: this is another reason to disbelieve the existence of a very high and snowy range in this quarter, for such is ever found to give source to great streams (see para. 7.) The Tukkus is laid down in the latest maps as running north into the Russian territory, but according to the information received by us, runs south into the Chinese. The geography of this country seems destined to remain long obscure. It is no longer the scene of important events, nor does it lie in the line of traveller's routes. The cities of Kashghur and Yarkund are indeed visited by merchants of Kushmeer, Pushwar, Budukhshan, and Toorkistan, and from them tea, silver, and some other Chinese commodities are diffused over the neighbouring countries. Few however proceed further, and inquiry is scarcely safe under the jealous and vigilant government of China.

Lakes.

47. Most of the lakes of note have been already alluded to. The greatest is the Aral, which receives all the rivers of Toorkistan. Its waters are salt. Those of the lake of Seestan are slightly brackish. The whole of this last can be seen in one view by a spectator from the shore. It is encompassed by a tract of marshy land overgrown with reeds and aquatics, and a day's journey in breadth. In the middle is a little high island and on it a fort, this island is called Koh-i-zoor, and is in north latitude 31° 35′ and east longitude 63° 25′. The well known Dul and Oollur are situated in Kushmeer. The latter is formed by the Uidusta; the former is unconnected with it, except that when raised by rains it discharges its superfluous waters into that river. No particulars are yet known of the lake of Toorfan (see para. 46) which is perhaps fabulous. Neither the

Aral nor the Seestan lake are navigated except by fishers or fowlers. The rivers too we have enumerated are more generally an obstruction to intercourse than a facility. Wood is indeed floated on them from the mountains, and in some cases goods are conveyed on rafts from a higher to a lower place. We are also to except the Indus and its eastern tributaries, which are navigated by trading boats as on the rivers of our own provinces. The trade thus carried on is indeed far inferior in amount to what is anticipated, and that especially in the case of the Indus. In lower Sindh and Kushmeer alone water carriage is the chief mode of transportation in the country. But these, and the particulars of ferries and fords, and modes of crossing rivers, need not be here mentioned in detail, since they are in the province of Lieut. Macartney. I may have appeared to have already greatly encroached on it, but this introductory matter seemed necessary to the readily and correctly apprehending what follows.

(*To be continued.*)

JOURNAL

OF

THE ASIATIC SOCIETY.

No. 94.—OCTOBER, 1839.

ART. I.—*Memoir on the Climate, Soil, Produce, and Husbandry of Afghanistan and the Neighbouring Countries.—By Lieut.* IRWIN.[1]

PART I.—OF CLIMATE.

SECTION I.—*Of Temperature.*

48. Even the most northerly parts of these countries lie in latitudes considered warm in Europe. But it is sufficiently known that latitude alone does not decide the temperature of countries. In the same parallel of latitude in the Russian empire the heat is less as the eastern longitude is greater. The causes of this difference seem yet unassigned, and until they be both assigned in a satisfactory manner, and shewn to be common to the southern parts of Europe and Asia in the same longitudes, there is but slight ground for concluding *a priori* the fact to be similar in them. The influence of altitude however on the temperature of place is undeniable, and exemplified in many familiar instances. Nor can it be denied, that the greater or less frequency and severity of rains must affect the heat of a place. Other causes might also be mentioned, for instance, the course of the winds. Distinct also from those which influence the annual heat of any place, there are causes which affect the equability of heat during the succession of the seasons. Maritime places have a temperature more uniform than inland. Even considerable inland lakes communicate a more equable temperature to their banks. The effects are the same of moisture in the soil. Countries whose surface is chiefly formed of sand or stones have more

1 Continued from p. 776.

rigorous winters and more sultry summers than others in similar circumstances. The periods of the rains, the course of the winds, and perhaps some other circumstances, are to be weighed when a theory is to be given of the phenomena. I here content myself with detailing facts as far as known, with occasional reference to probable causes.

49. From Delhi to Peshawur, by the royal road which conducts through Lodhiana, Umrutsir, and Rohtak, the heat of the climate as estimated by that of all the seasons of the year, generally speaking, gradually diminishes. Even at Lodhiana, it is said, few nights are known in the season of greatest sultriness which have the oppressive heat of those sometimes experienced in our provinces. Whenever the road conducts near the great northern mountains, unusual coolness is experienced; but the neighbourhood of inferior hills seems in the summer at least to increase the heat. To this cause, and to the scantiness of the summer rains, we may attribute the sultriness of Peshawur in the midsummer. All the natives agreed in representing the summer of 1809, which was partly passed there by the Embassy, as unusually cool. Yet the heat by day, of the weather in May and part of June was considerable, and was on the increase when we left that place on the 12th of June. No relief is in ordinary years to be expected until the month of July, when either showers fall or the air is cooled by winds from the east, in which quarter the rains have commenced. Hence June may be concluded a warmer, or at least as warm a month as in Delhi. If the summer of 1809 be not supposed altogether singular, the nights in Peshawur are seldom disagreeably warm to those who avoid sleeping within the houses, and prefer the terraces. The summer too is of later commencement, and declines sooner than ours. The whole of the month of March may be excluded from it. The Hinduwee month Ussoo or Koonar, beginning on an average on the 13th September, is there called the first-born of the winter, an epithet it by no means deserves in our provinces, in which September is often warmer than August;—add to this, that the winter season is severer in Peshawur than here. Old persons remember a fall of snow, which, however, they acknowledge instantly melted. Frost is very frequently experienced in every season. On the whole then, it cannot be doubted that the annual heat is less in Peshawur than in any part of the Bengal provinces, except the skirts of the great northern hills. In this and many other cases we should be deceived were we to build conclusions on the proverbial expressions of the country, without inquiring by whom, and on a comparison with what, they are spoken. To the Afghans of the hills, Peshawur may seem

the seat of the most intolerable heat, because situated not far from temperate climates, and still the annual heat be under that of Delhi.

50. Bajour and Punjkora are considerably cooler in summer and colder in winter than Peshawur; a winter does not pass without a fall of snow, which is perhaps not melted in less than two days, sometimes a much longer space. Even in Koonar snow falls, though it soon melts except in the shade. Lughman is warmer in a small degree than Koonar, and Jellalabad than Lughman. These positions are to be understood of the plains only of these countries; the hills and mountains are cooler than they, and in a degree proportionate to their height. But during the summer there is generated the most excessive heat among the low hills of the Turnkzy tribe of the upper Mihmunds, which from their bareness and dryness are commonly called the Bedoulut hills. Kohat is supposed to be a little cooler than Peshawur, and Malgeen is probably of a temperature the same as that of Kohat. Bunnoo and Eesa-Khel cannot be very different. The plains of Chhuchh-Huzara and Pukhlee are probably a little cooler than that part of the plain of Peshawur in which the city is situated. Moozufferabad is cooler than they, but is still to be pronounced a warm climate. Snow falls in Khanpoor of the Gukhurs. The more southern parts of this Doab are warmer.

51. The nether part of the Punjab, which includes Mooltan, is far warmer than the upper, and that for several reasons—a lower latitude, rains much more scanty, and the greater distance of cold mountains. The winter in Mooltan seems severer than in our provinces, and as in Bengal is accompanied with mists. The summer-heat, on the other hand, is probably greater. Mooltan, Seeweestan, and the Daman, are proverbial for heat. The nether Sindh is perhaps cooler, although situated more to the south, because it has more abundant rains. Its summer is certainly far cooler, being moderated by the neighbourhood of the sea; but, on the other hand, the same circumstance abates the cold of its winter. Notwithstanding its lowness, and probably moisture, the climate is much commended, especially in the southern parts. The country of Kuchh and the coasts of Bulochistan have a similar climate, neither hot in summer nor cold in winter. Kirachee is represented as unhealthy. The interior of Bulochistan is in general a hot country, but when the hills rise to a considerable height the climate becomes temperate. In Kilat snow lies on the ground during the greater part of winter; the summer however is warm. There are some inhabited places even colder than this in Bulochistan, on the whole however that country must be described as a warm one.

52. Cabul must be reckoned a temperate, perhaps a cold climate. In the three signs of the zodiac, Sagittarius, Capricornus, and Aquarius, the snow lies in the neighbourhood of the city. In Pisces it melts in the low and frequented places, but remains in the higher and less frequented. In this month are copious falls of rain, sleet, and snow. The first day of the ensuing sign of Aries is the vernal equinox, by the Persians and the people of these countries called Nouraz, because with it the natural year is considered as commencing. In Persia especially it is celebrated with much joy and festivity. In this month whatever remains of the snow melts in the plains. The summer which now succeeds is so temperate that the heat in the shade is never disagreeable, and no night is so warm as that a thick covering can be dispensed with. But the heat of the summer's day must be greater and steadier than in England, since rice and maize ripen in this district. The heat of the mid-day sun is indeed described as very great, and equally disagreeable as in the warm climate of Peshawur, where though the heat be unquestionably greater, its effects on the feelings and constitution are moderated by a more copious perspiration. The fact is to be accounted for, not by supposing the atmosphere of Cabul a moist one, for on the contrary the air of high places is usually dry, but by the difference of temperature. A temperature uniformly high, both in the sun and shade, in Peshawur keeps open the pores, which thus admit of a perspiration which relieves the body, but in Cabul they are kept shut by the coolness of the air in the shade. Cabul although warmer in the summer than England, is probably colder in winter. This we are to attribute to a situation more inland, and a sky less overcast; for it is certain that clouds moderate both heat and cold, as indicated by the thermometer. The climate is on the whole good, but is more commended by the opulent than the poor, of whom many leave the district in the winter for the warmer ones to the east, induced by the severity of the cold, the scarcity of fuel, and the difficulty of obtaining employment and wages in that season.

53. The valley of Cabul itself is diversified with inequalities of surface and varieties of exposure, and the neighbouring districts still more so. The temperature varies accordingly often within short distances, and it is impossible to give accounts more than generally true. The Kohdamun is colder than the immediate vicinity of Cabul, or the eastern part of the valley. The Kohistan and Ghorbund are colder than the Kohdamun. The summer heat of Ghorbund is said to be distressing to the Huzaras of the neighbouring hills. We have

seen that the Huzara mountains are not of the greatest height, but the cultivated and inhabited valleys being little beneath the level of the mountains are remarkable for their cold. In some of them the wheat harvest is scarcely completed in September. Some of those which open towards Bactria are warmer than Cabul, and the cotton plant is cultivated with advantage. In Cabul it may be and is raised, but the produce is little. Ghuznee and all the places situated on that high plain are noted for cold. That city is said to have been buried in snow nine days after the vernal equinox, yet I apprehend the real cold is not very different from that of Cabul, since the operations of agriculture and the harvest are but a few days later. To the feelings the cold of Ghuznee is made more sensible because of the want of shelter in the country. Mookr and Kura-Bagh are warmer than Cabul, and from Ghuznee to Candahar the temperature increases every stage.

54. Kushmeer is like Cabul a high valley, and in latitude somewhat more northerly. It is certain the winter is milder both in reality and to the feelings. The same periods are indeed assigned to it, and the snow lies during the same month, but it does not possess that cold felt in Cabul. The natives with no other protection to their feet than sandals of rice-straw travel in it without apprehension, and even in the depth of winter pass the heights which separate their valley from Kishtwar and its other dependencies to the south. Instances are rare of their losing their toes or fingers by the frost, but this is no uncommon occurrence to travellers in the countries of Cabul and Ghuznee. The wolf of Kushmeer has not that ferocity which he possesses in the severer winter of the last mentioned quarters. It is true the Vidusta is sometimes frozen over, whereas the river of Cabul after the junction of the Ghorbund stream never is; but a sufficient cause of this difference is seen in its greater rapidity. The summer of Kushmeer is probably of the same temperature as that of Cabul, but it is oftener cooled by showers. The complexion of the natives, which is usually a yellowish sallow, seems to indicate a climate on the whole warmer than Cabul. The Cabulies descended of families long established in their valley, are nearly as fair as Englishmen. To the feelings it is certain Cabul has the colder air, by reason of its breezy climate, while Kushmeer is a still climate.

55. It would be a tedious task (even were it possible) to particularize the temperatures of the various inhabited places among the mountains and hills already enumerated. They may often be conjectured to a considerable degree of accuracy by adverting to some circumstan-

ces formerly detailed—the height of the hills, their character, whether steep or tame, and that of their valleys, whether deep and narrow, or the contrary. Slopes and plains even of moderately high hills have a cool and healthy air, but deep vales in the bosom of even the highest mountains have a hot summer, rendered still more disagreeable by stagnation of air, yet even they are warm only in comparison with their immediate neighbourhood. Of this class is the valley of Chitrul, so called from a town situated on the Kashkar river, and the capital of one of the four principalities of that country, (see paragraph 17.) The numerous valleys of Swad, Bhooner, and Pukhlee are warm, as is that of Khost, comprehended in the revenue division of Bunnoo, from which it lies in a westerly direction, in the bosom of the range of 32½°. The valley of Jajee is as cold as Cabul, that of Toree is warmer. Teera situated on the range of 34°, Oorgoon on that of 32½°, parts of upper Bungush, and the valleys in the Jadran range are somewhat warmer than Cabul. Zhob, in the Kakur country, is much warmer than Cabul, but much colder than Candahar. Even Pushing, or as the Afghans call it Psheen, the country of the Tureens, is somewhat cooler than Candahar; but Shorabuk, or the country of the Bureches, is of the same temperature.

56. The country of the Dooranees considered as a whole, is of a temperature intermediate between Cabul and Peshawur, but exhibits considerable diversities within its own extent. Teeree, inhabited partly by Huzaras partly by Dooranees, is a cold place, falling not much short of the warmer parts of Cabul. The country called Zumeendawur, lying on the right of the Helbund in its further progress (see para. 41) is a temperate one. No winter there passes without snow, but to it succeeds the *gurm seer* (so called even in Tamerlane's time) in which there falls no snow. It lies WSW. of Candahar, which is only a little cooler. In some winters snow falls there, but it soon melts. The intensity of the summer heat is however moderated by western and northern breezes, and close nights are quite unknown. Few towns are more healthy than Candahar. Furah, although in a latitude somewhat higher, is warmer than Candahar; Subzwar, or Isfazar of the Zooree tribe, is much cooler, by reason of its being situated on high land. Hirat is still cooler, and is probably not very different from Bokhara, to be afterwards mentioned. Still colder are the vallies of the Ymaks, which are yet far more temperate than those of the Huzaras, and generally speaking similar to Cabul. In Muro snow lies but a short time after falling. Toorshish is in a temperature perhaps the same as Hirat, and

Mushhud is considerably colder than both. Mushhud and Kilat of the Beéloches may be conjectured to have an animal heat not very different. Ghaeen and Birjund are various in different places, but generally may be pronounced intermediate between Hirat and Candahar. Seestan is warmer than the *gurm seer*, yet contains hills on which snow falls in the winter. The great desert to the south has a most sultry climate.

57. Snow falls every winter in the whole of Toorkistan, unless indeed there be any exception in the deserts towards the Caspian, of which our information is in most particulars very scanty. This country sloping westward, the eastern quarters are the coldest; but in the distance of a few miles there is frequently great differences of climate. It also deserves remark, that the kingdom of Bokhara and other parts west, being open countries, are also windy, and their air sharper to the feelings in the winter than that of the east. But no doubt exists of their real cold being less, for their winter is shorter, and the snow sooner melts. In Bokhara it seldom rains, but snows in the sign Sagittarius, which begins the 20th November. Snow falls knee deep in the course of the ensuing month Capricornus, and that quantity melts in five days. In some years there happens much greater falls, and it has been known to snow after the vernal equinox. The spring and autumn are generally temperate, and two months only of the summer are hot, namely Cancer, which begins the 20th of June, and Leo, but especially the former; the noonday winds then feel warm, but close nights are not known. The natives are not so fair as the Cabulies. Khwaruzm is warmer than Bokhara; the kingdom of Kokur is colder, and has both a healthier and pleasanter climate, though Bokhara cannot be said to be unhealthy. Taskund is nearly similar. The Kinghuzes live in a colder country than the Kuzzaks, whose country is yet colder than Bokhara, and not much warmer than Taskund, which borders on it to the east. Keerategin is a cold country, but some places are much colder than others. The town of Durwaz is noted in its own neighbourhood for heat, being situated in a deep and narrow valley.

58. Budukhshan being composed of vallies which take their origin in mountains covered with perpetual snow, and whose months have nearly the same level as the lower parts of Toorkistan, thus possesses great diversity of climate. In many of the loftier parts the crops are in some seasons spoiled by the frosts before ripening. All the considerable places, however, lie in temperate climates. Fyzabad is warmer than Cabul. The Koocha is not known to freeze at that town or

below it. The river of Koonduz, in a far warmer country, freezes every year so as to admit of horses passing it, but its current is more sluggish. In Bactria there is considerable diversity of climate, arising from circumstances already mentioned (see para. 19.) The climate of Bulkh is perhaps the warmest; summer and winter succeed one another by a very rapid transition, and both are severe. These circumstances coupled with the moisture of the air, render the place neither healthy nor agreeable, and the natives of Cabul had the greatest aversion to serving in Bulkh when that place was in reality, as now it is in name, under their monarchy; many of its villages, however, are healthy. Koonduz though low, moist, and warm like Bulkh is yet more healthy. The districts to the south and east are colder in various degrees. The lower part of the valley of Khost is warm, and no place in Bactria is so cold as Cabul. Shibirghan, Undukho, Mymuna, and Kuburmach are healthy, and their temperature somewhat less than that of Bulkh.

59. Chinese Toorkistan although in general more northerly than independent Toorkistan, has not a colder climate, but rather the contrary, for the inhabited places are for the most part in low plains. Kashghur is colder than Yarkund. The temperature very gradually declines as we proceed to the more northern parts. The Pamer is exceedingly cold, yet may be crossed in autumn. With the exception of Chitrul, already mentioned (see paragraph 55.) Kashkar is undoubtedly a cold country, but to what degree we cannot yet tell. All the Tibets have rigorous climates, considerably colder than Cabul, even in the cultivated vallies. Between the Tibets and Hindoostan, the Punjab and other countries to the south and south-west, there is every degree of temperature, from mountains clad in never melting snow, to low and sultry plains.

Section II.—*Of Winds.*

60. In most countries it requires the observation of many years to determine what winds on the whole are predominant, and in what seasons of the year; we are otherwise in danger of stating local and temporary phenomena as general and constant. In the total want, in the present case, of such records, and under the necessity, moreover, of relying on the testimony or rather opinion of others, who may not have considered the subject with the patience it requires, it must be expected that the present account shall be meagre, perhaps in many points erroneous.

61. Some facts however seem to be established on sufficient evidence. It may be asserted that in the whole of Toorkistan, Budukhshan, and the north in general, the prevailing wind is from the north. In Bokhara it blows with considerable violence in the signs Cancer, Leo, and Virgo; after three months cessation, it recommences, and blows, though with less vehemence, during Capricornus, Aquarius, and Pisces. These may with propriety be called midsummer and midwinter winds. The former are sometimes felt warm by day in Bokhara, the latter, when strong, are felt piercingly cold. Both vary from time to time in strength, blowing for seven to ten days with violence, and then remitting for nearly an equal time. In the wide space in which this northerly current prevails it may be supposed to have considerable variations in its direction, (for it need not be supposed to be always due north) strength, and other circumstances. It is not constant and strong in the west of Toorkistan, but it has occasionally given melancholy proofs of its power. It has submerged under sand the far greater part of the kingdom of Khwaruzm, and yearly curtails the habitable lands of Bokhara. The same evil consequences are not apprehended from the north winds in the quarter of Bulkh, yet even there they occasionally blow with great vehemence. In the war which Tymoor Shah waged in that country with the Oozbuks, there were six successive days in which these winds suspended all hostile operations. Budukhshan, except in some particular situations, has a still climate, by reason of the shelter afforded by its lofty mountains, and is not so breezy as even Cabul; the north winds however are there also the prevalent ones, though much diminished in their strength. It deserves remark, that the Persian word 'Shimal,' which properly means 'the north,' is in Toorkistan, Budukhshan, and the north in general familiarly understood by the signification of wind. In the Persian Gulph, the same denotes a blast. It is remarked in Bokhara that the south-east wind there, called 'Kypung,' is productive of great warmth, and when it occurs in the spring, the snow rapidly disappears.

62. If we pass from Toorkistan to Khoorasan we still find the same northern current to prevail in the western parts of that province—little change takes place in its direction, and even at Hirat it seems to be from nearly due north, but in longitudes more easterly its direct progress is opposed by the Paraparnisan mountains, which shelter that part of Khoorasan which lies to the south of them. At a moderate distance however from these mountains the current seems to recommence, though with diminished force and altered direction. It now inclines to the east of south, or even blows due east, as if to reach

the Afghan Khoorasan, it had been compelled to travel round the western end of the Paraparnisan range. In Candahar the direction of the midsummer winds is perhaps from the north-west, but at a considerable distance south from the Paraparnisan mountains the current resumes its force, and perhaps nearly returns to its former direction. In Seestan such is its force, that it has heaped up the sands of that country into waves; not a season passes but whole villages are buried under the sand, the inhabitants escaping with little beyond their lives, yet do they deem these winds a blessing. They moderate the heat, relieve them at times from the musquitos, and they turn their windmills. At Kilat of the Beeloches the midsummer winds are from the north, for this place is situated too far to the south to be effected by the Paraparnisan mountains.

63. Hirat lies open to the north, and if we except Seestan there is no part of Khoorasan where these winds blow with such vehemence as in its neighbourhood. It has a windy season of 120 days, which returns with such certainty, that relying on it they here use no watermills, but windmills only. These periodical winds seem to commence earlier in Hirat than in Bokhara, and in Seestan earlier still. In that part of Khoorasan which lies west of Hirat the summer winds though of considerable strength and regularity, are not relied on for grinding the whole of the crops, on the contrary watermills are commoner than windmills; in former times the latter were more used than now, as is proved by the ruins to be seen in the districts of Cabul, Muro, Zumundawur, in certain parts of the table land of Ghuznee, and other quarters where watermills only are now employed. This change of practice may have arisen from a change of opinion, watermills having been found more eligible in all but the most windy climates, as being oftener at command than the others; or it may be considered as one proof of what all the natives assert, that the seasons and weather have altered from what they were in former times.

64. I know not how far southward we can trace these northern and north-western winds, but in the eastern longitudes at least they do not extend to the Ocean. The wind there on the contrary, blows from the south during the greater part of summer. We can trace this wind as far as Buhawulpoor, in latitude 29° 22′, and perhaps a good deal further. This southerly wind blowing from the ocean, communicates to the climate of the nether Sindh an agreeable coolness. At Mooltan it shews itself rather in occasional blasts, than a constant current. By parity of reason these southerly winds may be supposed to extend a certain distance (varying in different longitudes with cir-

cumstances) from the ocean into Bulochistan. But we have already seen (paragraph 62) that it does not reach Kilat, the latitude of which is not very different from that of Mooltan. In Jodhpoor it is said the west or north-west wind is the commonest in the spring and summer months, until the commencement of the periodical rains. In the upper Punjab also the winds are represented as being in the various seasons not very different from those of our Upper Provinces. In both countries clouds seem to assemble from easterly points (especially in the rainy season) and winds from westerly points shed their contents.

65. The winter of 1808-9 was spent by the Cabul Mission chiefly at Beekaneer, between that place and the entrance into the hills beyond the Indus. It was remarked as being singularly still ; and generally it may be asserted, that in all these countries the winter is calmer than the summer, the night also is usually calmer than the day. Travellers tell us that such is the cold of the Pamer in the autumn—the season in which it is most commonly passed—that did not the wind die away by night, this route would not be practicable. As before observed the mid winds of Toorkistan are not so strong as the midsummer, and in Khoorasan they are not always traceable. In Candahar, and some other situations, the month of October is more remarked as windy, than the depth of winter. The cold winds of that month, or rather of the sign Scorpio, which begins the 20th of October, strip the trees of their foliage. The same sign of the zodiac is windy in our Upper Provinces and in Peshawur, and in both cases it blows from a westerly point. In Cabul also this season is generally windy, as also in the sign Pisces.

66. Cabul however though at most seasons breezy, is in none remarkably windy, the north and west winds chiefly prevail. The same positions are, I presume, true of Ghuznee, which, however, has less shelter. Kushmeer has been already mentioned as possessing a still climate. The stagnation of air is sometimes very disagreeable, especially to those who have been accustomed to the free circulation in Khoorasan. Other places there are remarkable for continual wind, a circumstance owing to their situation between hills, which by confining the current of air accelerates it. Such is Jummoo, built not far from the left of the Chunab, and some other places of less note. Jellalabad and Koonur have never-ceasing winds, chiefly from the west. These threaten to bury under sand the good lands of the former. In Peshawur and Bajour the prevailing wind during the whole of the summer is said to be the east, and the observations made during the stay of

the embassy in that country correspond to this opinion. In the winter the chief winds in Jellalabad, Koonur, Bajour, and Peshawur, is the west, and next to it the north, which in Bajour is in that season productive of great cold. In Peshawur and Bajour, as in our provinces, are occasional blasts during the spring and summer months; in the former place they blow from the west and south-west.

67. Even in Bokhara hot winds are known, but they are confined to a few weeks in the year, and a few hours in the day, and altogether are little regarded. This is equally true of those in Hirat, but the hot winds of Seestan are severe. Those of Peshawur have been already mentioned (see paragraph 49.) Jellalabad, which on the whole has a cooler climate, has severer hot winds than Peshawur, because of its lying to the west, or leeward of the Bedoulut hills (see paragraph 50.) The wind from them is moderated in its bad qualities before it reaches the city of Jellalabad. Within the tract in which it is generated it is a true Simoom or pestilential wind, and many instances are given of its proving fatal to travellers. On the night of the 21st June, the Cabul Mission experienced a wind of the most intolerable heat; it blew from the low hills on which Attock is situated, then bearing south. The hottest winds appear to proceed from, or blow over, low hills, whose rocks and stones acquire a higher temperature than the soil of the plains. In the warm parts of Bulochistan, hot winds of very great severity blow. Instances are few of their proving fatal, but not unfrequently they scorch the shoulders and backs of travellers.

Section III.—*Of the Rains.*

68. In India from the northern mountains to Cape Comorin, the grand rains are those which beginning about midsummer, continue to the middle or end of autumn. The monsoon of the Coromandel Coast forms an exception, caused by peculiar circumstances. The rains, so called by way of eminence, on an average of seasons begin in Calcutta in the first week of June, in Futthgurh about the 20th of that month, and in the intermediate situations they are later, according as the place is situated more or less to the west of Calcutta. This rule is true in a majority of places and seasons. In our progress westward, it is also found that the rains are more scanty. The annual inches of water in Calcutta, are thrice those in Delhi. It is only in the lower parts of Bengal, that in the same season rains fall in the four successive Hinduwee months, Usarh, Sawun, Bhador, Koonar, of

which the first begins about the 13th of June; far less can four months be counted in the Upper Provinces between the first and the last shower. Yet is 'Chowmasa' a term for the rains, in the whole of the Bengal provinces. The rains of the first and fourth month are more scanty and uncertain than of the second and third. The second again is more rainy than the third, and its rains more seldom fail; it begins about the 13th of July. Places in the same longitude have more or less rain, according to their proximity to the great northern hills. This rule, however, does not extend to all places, for those which are near hills of considerable height within India itself, receive from that circumstance more copious rains. It is thus the province of Kuttack is more rainy than even the neighbourhood of Calcutta. Very many places in the Marhatta territories and the Dukhan are far more rainy than those in corresponding longitudes within our Upper Provinces. When other circumstances are equal, the number of inches of water which fall in the year diminishes in proportion as we recede from the sea. Hence Jodhpoor and Oodeepoor have more rains than Beekaneer or Jypoor.

69. The rains of Hindoostan extend to certain points in these countries, and their periods and quantities are according to the laws just mentioned. The rains of Lahour are later, and less than those of Delhi. Those of Pothwar are still more so, and only the two middle months are relied on. One heavy shower in the month of September is of the utmost importance to their crops, but in some years is longed for in vain. In Peshawur only the second month of the rains remains; nay, some seasons pass in which all are denied. The husbandman, however, sows in expectation of the rain of Sawun. From Peshawur we trace the rains to a termination in Lughman and Jellalabad, where they dwindle to a few showers. It thus appears that they diminish in our progress westward. But this rule is modified by others. Pukhlee, upper Sward, Punjkora, and Bajour, of which the two last are more west in longitude than Peshawur, have, as being hilly or near hills, much more rain than that place. Kushmeer lying to the east of all these has yet but a few showers, for the mountains to the south shut out the rains in this quarter, though we find by Captain Turner's account, that they have not this effect in the part of Tibet he visited. Barah-Moola, lying in the narrow pass leading to Kushmeer from the west, not only has a portion of the great rains, but showers in all the months in the year. Teera enjoys the four months of rain, but the showers are light. It is even said that it rains every day of the year in some part of the plains or the vallies of Teera. To the north the

great chain of mountains does not allow the rains to fall in Kashkur, but the country of the Kafeis has an equal share with Bajour.

70. We have thus traced the summer rains in the high latitudes. In the middle latitudes they extend to all the sources of the river Koorm, being here diminished in duration to less than one month. These showers are generally severe, and important to the agriculture of the country. By the Afghans they are called, 'Vuse,' a term plainly of Indian origin. In latitudes still more southerly it is difficult to lay down the limits. The 'Vuse' certainly does not reach Candahar, but is sufficiently regular at Zhob of the Kakurs. It is said to reach Kilat of the Beeloches, but is not there the chief rain. Nay, it is by one person asserted to be known as far west as Punjgoor. This is rendered incredible by adverting that that place is not very distant from the sea. Natives of Persia assure us that in most seasons there is a heavy fall of rain in the month of August in the province of Laristan; and I presume this is equally true of the coast of Kirman. It is probably the neighbourhood of the sea which gives to lower Sindh a rainy season of greater length than the upper, and perhaps not greatly inferior to that of the upper Punjab, yet has it been known in some years to fail, but the circumstance is of little importance to agriculture. Mooltan, distant at once from the sea and from the mountains, has very little remaining of the rains, less than any part, it is probable, of Sindh or Seeweestan, or the Daman and Makalwad, though lying to the west. Buhwulpoor has more rain than Mooltan. The rains of Beekaneer are somewhat uncertain and scanty, for a country situated on this side the desert. Showers sometimes fall in Seestan during the summer, but they are unconnected with the rains of India.

71. In the Bengal provinces next in importance to the grand summer rains, are the showers which fall in the winter. By the natives this rain is called 'Muhawut,' because the greater part fall in the Hinduwee month Magh, which on an average of seasons begins on the 13th of January. The farmers in what is called the Puharturee, or the tract of country lying at the foot of the great northern mountains, do not even water their rubbee crops, but trust to this rain, which however in some years fails, even there and in many parts of the plains more distant from the hills. The Muhawut extends from our provinces as far as Jodhpoor; but with respect to many parts of India I do not possess information as to whether it occurs or not. Part of the rainy monsoon of the Coromandel Coast coincides in time with it, but far exceeds it in quantity and importance. In the season 1808-9 it failed in our Upper Provinces in general, a circumstance productive of great

loss to the former. Neither did it occur in or near any place where the Mission was, that is between Beekaneer and Dera-Ismael Khan, but in those latter countries the want of it is productive of little or no inconvenience.

72. In the same season it fell abundantly in Peshawur, a province where a great proportion of the rubbee depends upon it; and all the countries now treated of, with the exception to be mentioned, enjoy it with tolerable regularity. It falls according to circumstances in the form of rain, sleet, or snow; and with respect to the time it may be expected, the chief showers are (as in England) rather in the second than the first half of winter. Although the time varies in different years, it is seldom that it fails altogether. The consequence of such a failure is dearth, sometimes famine. Where it used to fall as rain, the crops die from drought, or are killed by the severity of the frost that usually accompanies dry winters; where it used to fall as snow, the crops wanting this protection are exposed to the frost, and the hopes of the spring which partly rested on the melting of the snows in the hills are disappointed. There is a favorite proverb in Cabul, "let Cabul be filled with snow rather than gold." The quantity which falls is very various, according to season and places. The highest and most mountainous places appear to receive most, but this rule alone does not comprehend all cases. In Cabul the number of snowy days in the three months of winter is computed at sixteen. If we may form any judgment from the hints given us in Forster's Journal, this is more than occurs in Khoorasan. In the Punjab this rain is certainly of much inferior importance, perhaps it is of inferior amount, and less certain in its periodical return. But that quarter where it is most uncertain and most insignificant, is the same in which the summer rains are so scanty, and in which the Mission spent the depth of the winter 1808-9 (see paragraphs 70 and 71) being Mooltan, and a certain distance around it. In the Daman this rain is sufficiently regular, and of great importance. In nether Sindh, although of very little importance, it falls in most years. It may be observed that it extends far beyond the limits of the present field, to the Hellespont and the Russian frontier. The same is the chief rain in the north-west of Arabia. In none of the intermediate countries, whether cold or warm, is it lost. It is said to be but scanty in Yarkund, but with respect to many other parts of Chinese Toorkistan we possess little information on this, or most other particulars.

73. The third rain we may distinguish, is that of the spring. It is perhaps the most important of the whole in the countries lying west

of the Indoor, north of its sources; in all of which it is confidently expected, and fails only in the most calamitous seasons or peculiar situations. In the neighbourhood of Candahar indeed, and the country of the Tureens, it is said to be but scanty, and little rain is looked for after the vernal equinox. The falls of snow and rain in the winter are in these places their chief dependance for the success of such crops as are not artificially watered. The spring falls are not confined to the countries under our view, but north and west, extend to the east coast of Arabia, a part at least of Syria, the Hellespont and Euxine, and the Russian frontiers; towards India we find them tolerably regular in the middle and lower Sindh, but in the latter they are the less regarded, as they are of little use to agriculture, and in quantity inferior to those of the summer. In the upper Sindh and in Mooltan respectively, the summer and spring rains are perhaps equal. In the year 1809, some considerable spring showers fell in Mooltan, but in ordinary seasons this, like the preceding rains, is there but scanty and uncertain. In Peshawur, Kohat, Malgun, Fesakhel, and Bunnoo the spring is the chief rain of the year, the same is true of Chhuchh, Huzara, Kushmeer, and perhaps Bukhlee, but in Pothwar it is exceeded by the summer rain. We have seen that the latter diminishes as we proceed westwards. The spring rains, on the contrary, diminish as we proceed eastwards from Peshawur. This law however is modified by others; and those of Kushmeer, as being a country embosomed in hills, are more abundant than those of Peshawur. It is difficult to fix the eastern limits of this rain. Within the great northern mountains, and to a certain distance from their foot, it seems to extend in ordinary seasons even to the banks of the Burmphootr, but in the plains of India nothing remains of it but some thunder-storms accompanied with showers.

74. Within the limits in which it is regular it is more or less copious, according to the season and place. Cabul receives more than Peshawur or most parts of Khoorasan, and Fyzabad more than Cabul. In Budukhshan, Durwaz, Keerategin, and the east of Toorkistan it is very abundant, but in Yarkund very scanty. In different places as well as in different seasons, there is some diversity in the season of this rain, but it would be tedious to enumerate instances. In general most rain falls in the month of March, but in some cases the heaviest showers are at the end of February or month of April; rain in the month of May in most of these countries is not to be considered as part of the spring rains, but rather as accidental, and indeed unwelcome. In May 1806, there fell in Cabul a heavy rain which did much damage. Where

fruits are cultivated to a great extent. Rain in the summer is much deprecated, yet in some parts of Toorkistan showers are neither uncommon nor unwelcome even in the end of May. Generally speaking, May is a dry month in the countries under our view. June too is dry, and where the rains of Hindoostan extend, the hottest. The heat declines in August in both descriptions of countries. August is in Peshawur a cloudy month, not a rainy, and is dry in all the countries west of the Indus, as is September. October is a dry month both in India and in these countries. In high and mountainous situations snow begins to fall in November, but the chief showers are in December and January.

75. Dews and mists are often little less important to the husbandman than rains. They do not here attract much attention. They are commonest in the autumnal months, or the beginning of winter, and in the warm countries especially, if well watered and of a humid soil. Mooltan and Sindh to the south, and Peshawur to the north, seem the most noted for mists. The dews of Peshawur in August, September, and October, are said to be heavy. In September the people are induced from fear of the effects of the dews, as well as from the chilliness, to cease sleeping on the terraces. The spring there is more dewy than in Hindoostan. With respect to clouds and overcast weather, the cold countries have more than the warm. The atmosphere of Kushmeer is cloudy during a considerable part of the year; May and June are its most sunny months, but in July, when it begins to rain in the Punjab, the clouds extend to Kushmeer. In the cold countries in general, clouds are observed to gather from the beginning of October, preparatory to the snows, which are to follow.

76. On the whole the vast tract here surveyed must be pronounced to have a dry climate, whether we regard the quantity of moisture which falls in the year, or the number of rainy days. The districts which can be called humid are comparatively few and unimportant; the rains even of our Upper Provinces astonish the natives of Afghanistan. The spring rains are the chief in Peshawur, and the season 1809 was a favorable one, yet were there but seven days of heavy rain, and four of light. It would be difficult to form an accurate scale of the dryness and humidity of the various districts already enumerated, but a conjecture may be formed from the data already given. Khoorasan is on the whole drier than those parts of Afghanistan not included within it, or than Toorkistan. Bulochistan is undoubtedly a dry climate. The west of Toorkistan is far drier than

the east or south-east. Budukhshan, Durwaz, and Keerategin Budukhshan are more humid than Cabul, as is Kushmeer. The humidity of Kushmeer adapts it for the production of rice, which however is there raised chiefly by artificial watering, and ripens in the drier part of the year. The dry and sunny summer of Cabul is favorable to the delicate fruits of the cold and temperate climates, which are here cultivated to a great extent and with much success, but in Kushmeer the apple only can be commended. Within the limits of India there is no place perhaps where less rain falls, and that little so irregular, as the neighbourhood of Mooltan. This however is little regarded by the farmer, who waters his khuruf crop from wells or canals drawn from the river, and raises a proportion of his rubbee on the moist lands which in the cold season the river has abandoned. Nor does the scantiness of the rains imply a dry air. Mists have been already mentioned as common there in the winter.

77. Having now mentioned in succession the altitudes of the mountains and their course, the slope and conformation of the land, the sources of the rivers, the heat of the climates, and the periods and quantities of the rains and snow, we may proceed to deduce from these facts in combination the periods of the rising and falling of the streams and rivers. Few considerations are more important to the farmer and the traveller, or to armies.

78. In perfect plains in a warm climate we rarely find constant streams to originate. The rains of such countries though copious, are violent and of short duration. During the greater part of the year no moisture falls. The rains of the rainy season are drained off with a rapidity corresponding to their violence and their short duration. In their passage they cut deep channels which are dry during other parts of the year; such are very numerous in India, and are by us called dry nullahs. After rain they are always inconvenient to travellers, sometimes dangerous. Where they afford a level higher than the neighbouring ground under tillage, they are not without their use in agriculture, for by a little pains the water they discharge may be turned upon the fields. The Afghans are very sensible of their value, and reckon lands situated so as to be watered from them next to those which can be watered from constant streams, and superior to such as receive no water but what falls on their own surface. A dry nullah is in Pushtoo called '*Khevur*,' and in the Hindhee of Peshawur and the west of the Punjab, '*Kus*.' Even low hills in a warm climate usually give out but temporary streams. The snow which may fall on them soon melts, and the

springs which are found in them do not generally give out water. It is therefore plain that the periods of such streams as may originate in them must be the same as those of the rains and snows of the country; such are often of the greatest importance to the husbandry of a little neighbourhood, but their fame does not pass beyond those bounds. The Swan and Huro alone of this class are deserving of mention. They seem to have no periods distinct from the rains in the country, but their springs are sufficient to preserve them running streams at all seasons until they gain the Indus, whereas most others lose themselves, or are expended on the fields, in all seasons but the rainy, and some do not in any season reach the sea or a river.

79. We every day hear of mountains so lofty as to be covered with never melting snow. The expression construed in strictness would lead to an erroneous conclusion, for, that ice or snow can only remain unmelted which lies in a place whose temperature is never above the freezing point, and few such can be found within the habitable climates. Snow gradually disappears even during a hard frost. Part it is true, is carried off by evaporation, but part also is melted by the heat of the earth. The rivers of Switzerland rise from under glaciers of solid ice. As the inferior snows are gradually melted away, part of the upper also deprived of this support, either gradually slide down the declivities, or fall in avalanches, themselves to be melted in lower and warmer regions. The snow and ice are therefore perennial only because they are supplied from time to time as fast as they are consumed. It is also evident from the same principles, that the fall of snow in winter must in all cases have some tendency to augment the streams, since part is forthwith melted by the heat of the earth. But where these streams originate in hills of considerable altitudes, a far greater part is as it were stored up for a warmer season, and according to the degree of that altitude, and the cold consequent upon it, the season of its melting is later or earlier. While the snows of the low hills are rapidly melting by the warmth and the rains of March, it is at the same time snowing on the high mountains, whose previous stores are as yet unaffected by the weather. The increasing heat at length dissolves them in the order of their altitude, the highest of all melting at midsummer. It is therefore evident that as far as depends on the melting of the snow, streams rising in low hills must be highest in the spring, and streams rising in high hills in the summer; and the periods of the streams would thus be an index of the altitude of their sources. But when a river is fed by the snows of both high and low hills, we

cannot thus decide without adverting to other circumstances. If the low hills be extensive, the flood they occasion may surpass that arising from the melting of the high snows, under which are situated the uppermost sources of the river. If the river be highest in summer, we may decide that it has lofty mountains at its head. This conclusion however is just only when we put out of view the periods of the rains, and decide from those of the thaws only. Both considerations must be combined in our judgment in particular instances, to which we now proceed.

80. The periods of the Indus and the rivers of the Punjab are nearly the same as those of the Ganges and its tributary branches, which are lowest in the winter, rise somewhat in the spring, and are highest in the middle of August. The rise in the great Ganges is perhaps gradual, certain, and nearly of the same quantity in different years; for being fed by many streams one chance and anomoly corrects another, but the same is not true of its branches, including the upper Ganges itself. The annual rise at Hurdwar is six or seven feet; in the lower part of Bengal above the influence of the tide, it is thirty-one. This difference, may I believe, be shewn to be a consequence from the general principles of hydrostatics; it must therefore be supposed to exist in the case of the Indus and its branches, for they also run in a champaign country and yielding soil. My inquiries tend to confirm this opinion. After rains of uncommon severity the rivers of the Punjab sometimes rise to a great height; the effect however is temporary, and many seasons pass in which no such extraordinary floods occur. The great Indus after the junction of the Punjnud is from various causes less affected by local and temporary circumstances, but its regular and annual rise is greater than that of any of its branches. The branches have diversities among themselves not reducible under one general rule, but caused by special circumstances. The Ranee, which is the least of all the rivers, had yet in 1809 a rise equal to any of them. When other circumstances are the same, streams which run in sand increase more in breadth in their flood season, and those which run in clay increase more in depth. The annual rise of the great Indus I reckon about sixteen feet; that of the Ganges is thirty-one; and of the Nile twenty-four. The proportion in which their waters are respectively increased it would be more difficult to estimate. The same causes combine in the raising the Indus and its branches, and the rivers of our provinces—that it both thaws and rains. The effects in this respect are different, in that there is no inundation in the Punjab or Sindh, for we cannot apply that term where the tracts covered

are insignificant in proportion to the whole surface. The character of the Punjab is different from that of Bengal or Egypt. Instead of the banks of the river being higher than the remoter country, the various Doabs usually slope from their interior towards the rivers which bound them. Low tracts are sometimes found, which after heavy rains are covered to some depth with water; but there is no general inundation derived either from rain or from rivers, as in Bengal. The surface of the Punjab, however, after excluding the country beyond the Hydaspes, is lower above the level of its rivers than that of our Upper Provinces in general, with respect to the rivers which run in them.

81. The periods of the Cabul river where it joins the Indus are nearly the same as those of it. It is lowest in the winter, notwithstanding the rains of that season in the valley of Peshawur. It is sensibly affected by the spring rains in February and March. It falls after they have passed over, yet not to its level in the winter, for now the snow of the lesser hills begins to thaw. At the end of May the middle snows begin to descend, and after them the upper, which bring the river to its greatest height at the beginning of August. We are to attribute the effect in part to the rains, which fall at that period at some of its sources (see paragraph 69.) Such is the history of the grand streams, but there is a diversity of circumstances with respect to the branches composing it. The Pech river swells early in spring, and declines from about the 28th of May. The Punjkora river follows nearly the same laws, though indeed heavy rain in the months of July or August will cause it to reach its greatest height in those months. The three streams in the valley of Cabul (see paragraph 36), the Lughman river, the Kashkar, and the Swad, with the rivulets of Jellalabad are highest in the month of July or August. The Bara is on the whole the greatest in the spring, but it rises and falls very suddenly, and very often according to the occurrence or cessation of rain in Teera. The To is probably greatest in spring; the Koorm is greatest in July or August, when it is swelled both by the *Vuse* (see paragraph 70) and by the thawing of the upper snows. The Gomul is perhaps the highest at the same time.

82. The diminutive streams of Bulochistan and Seeweestan are in general highest in the spring. The same is true of those found in the western Khoorasan, the Turmuk, and the little streams of the Kakna, Tureen, and Burch countries. Even those rivers which taking their rise in the Paraparnisan flow into Khoorasan, reach their greatest height during the periodical spring rains. The Helbund only which

rises in the most elevated part of that ridge continues to increase after that period. It perhaps reaches its acme the first week of June, but I have received contradictory information on the subject. The Murghab, and whatever streams are found in the Jumsheedee country, in Mymuna, and Undkho, may be presumed to be highest in the spring.

83. The Oxus and Jaxartes, and all their remaining branches which have been enumerated in the introduction, including the streams of Bulkh, rise in the spring, but are highest in the summer, notwithstanding the draught of that season. Some of the subordinate streams are higher in spring than in summer, but they are considerable enough to impart the same character to the principal ones into which they discharge themselves. With respect to the Neelum, and the rivers of Chinese Toorkistan, we know little beyond their names. From circumstances it may be conjectured that they are higher in summer than in spring.

Section IV.—*Of Salubrity.*

84. I am able to offer but a few detached observations on this subject. Its importance induces me not to pass it altogether in silence, although my opportunities have been small, and its natural difficulties are very great. There are few subjects on which opinions are so contradictory, and so many regular prejudices prevail. Medicine is at a low ebb in the country, and its professors entertain many absurd opinions respecting the original causes of disease, most of which they deduce from the qualities they attribute to different species of food, paying little regard to the operation of other causes, which among us are considered as the most palpable and powerful. The doctrines of Avicena are much followed, especially in Toorkistan. Physicians in these countries are not liberally rewarded, and many are obliged to travel from place to place in pursuit of a livelihood. These are chiefly natives of Peshawur and its neighbourhood, and their travels are principally confined to Toorkistan, which they visit on the opening of the spring. Few or no natives of Toorkistan or Khoorasan pass into other countries with such views. Some of these itinerants add the practice of the *ruml*, and other occult arts, to their accomplishments. They traverse great spaces, and being everywhere welcome, have the best

means of observing the manners of the people, as well as the nature of the country. Accordingly there are found among them many who are stored with curious and useful information. In their own profession they seem to be judicious, according as they have more or less discarded the absurd theories of their books, and proceeded on their own observations, and the practical remarks current in the quarters they have visited. Although surgery be on the whole in a low state, there are some operations which are here performed with great judgment. There are parts of the country in which continual strife prevails, and wounds are generally received, and yet scarcely one professed surgeon is to be found.

85. The Cabul Mission left Delhi on the 12th of October, 1808, and arrived at Beekaneer on the 5th of November. During its stay there many natives of the escort and camp followers were buried. This was not attributable to the unhealthiness of the place or season, but to some preceding circumstances,—severe marching in sand, bad or indifferent water on the route, and great vicissitudes of heat and cold between day and night in the month of October; but, above all, the incautiously eating water-melons and drinking water after heat and fatigue. In passing the desert some individuals were affected with *Nyktolopia*, but by proper treatment they speedily recovered. Diseases in Buhawulpoor, Mooltan, and Dera, and Ismaul-Khan are generally the same as those of our provinces, with the addition of eye complaints, which are comparatively rare in them. Coughs and catarrhs are common in Buhawulpoor. The natives of the detachment experienced during their stay in this country, a cold somewhat greater than that of their own. In the march to Peshawur they were exposed to severe rain, cold, and fatigue, combined. In Peshawur they were but ill accommodated, and exposed to heat and closeness, yet during all this time they were never unhealthy. They marched through the Punjab during the rains, a circumstance which far from being unfavorable, probably preserved them in greater health than they would have enjoyed if halted ; there is therefore no reason to conclude the countries they passed through to be unhealthy for strangers.

86. The water of the upper Punjab indeed, is celebrated both by natives and strangers, and the climate vaunted as remarkably salubrious. This boast is not altogether unjust, for here we find but little of the eye complaints so common in similar climates to the west and south. The Sikhs seem a healthy race, and there are found among them some fine persons and faces. They appear built, however, more for activity

than strength. They do not accustom themselves to foot service, and probably could not undergo great fatigue except on horseback. This is still more true of the natives of Toorkistan. Such is the plenty of horses in that country, and so much are they reckoned a necessary of life, that even beggars travel on horseback. The natives of Khoorasan have a great aversion to foot service, and do not excel in that species of travelling, in which the natives of India are generally acknowledged to surpass all their western neighbours. This is absurdly attributed to their foot, when it can be more naturally deduced from the state of their country and their mode of life. Among them none are equal to the Bhutties, or people of Bhutner, where there are said to be some who will travel 30 kos, and after robbing a village or a caravan return the same distance without halting. The people of Hurreeana are in this respect somewhat inferior, but are a robust nation, and in bravery surpass all their neighbours. Being now under our Government, it behoves us to consider how we shall make use of these qualities, or at least prevent them from being turned against us by an enemy. The hill tribes among the Afghans, and others, excel in climbing and in travelling among mountains. The Khyburees are employed in hill warfare as far east as Kot-Kangra, which is situated near the right bank of the Hyphasis before it leaves the mountains; but the Kohistanees are reckoned to excel all others in such operations, and have been known to fight well even in the plain. It is a common observation in the country, that the inhabitants of hills make little figure in war when they venture into the plains, and during the late broils more than one instance has occurred to confirm it. None is more striking than the defeat of Shooja-ool-Moolk, when in the spring of 1802 he brought a force of Khyburees against Peshawur. It is said their inability to bear the heat of the climate was the chief cause of their discomfiture, which terminated in many of them dying of thirst. The natives of the cold and temperate climates express the utmost dislike to the summer heat of that of the warm, but their impatience under it is not always in proportion to the coldness of their native places. The Cabulies support it better than the hill Afghans, or even the Dooranees, whose climate is much warmer than Cabul. This part of the Dooranee character has been very manifest in their history, and productive of important effects. The Persians, though inferior in courage, excel them in steadiness, another good quality of a soldier, and bear the extremities of heat and cold with equal patience. The poverty, ingenuity, and enterprising disposition of the Kushmeerees annually disperse considerable numbers of that nation

over the greatest variety of climates; and in pursuit of gain, they seem little to regard the heat or cold to be endured.

87. The natives of the warm climates do not manifest the same impatience of the winter cold climates; on the contrary, Cabul and Kushmeer are the theme of their praises. It seems doubtful whether this quality of the warm climates, by which those born in them are adapted to both species of climates, can be brought forward more in their commendation, or as an argument of their being plainly inferior to the others. It will be found generally true, that in cold climates there are more numerous diseases, perhaps more unhealthiness; but the natives are more robust and enjoy longer life. In these countries it is remarked that the hair sooner turns grey, and life is shorter in the warmer districts; eye complaints, moreover, are most common in them. When known in the cold, they usually proceed from travellers having exposed themselves to the glare of the snows; but the summer is the season of this complaint in the warm districts. Even those patients in whom they have become chronic, feel a remission of their pains in winter. The natives have no rational theory to account why they are more prevalent in some warm countries than in others. Because they affect moist districts rather than dry, these theorists maintain them to arise from the eating of rice, not adverting that they are not peculiarly severe in Kushmeer, and that there are places in which, though rice be the chief food, they are rarely known. It is a singular fact that ophthalmia begins to be common where the summer rains of India become scanty and uncertain. I am inclined to be of opinion with Volney, that it is caused by the dews and breezes to which those who sleep on the terraces expose themselves.

88. Fever is an universal complaint. Fevers are most common at the equinoxes, but those of the spring are generally of the hot species, where agues and low fevers prevail in the autumn—which, on the whole, is the unhealthiest season of the year. The former species of fevers are commoner in the cold than in the warm districts, and the reverse is true of the latter. The effusion of cold water in the paroxysms of hot fevers, though practised in Persia for ages, is here unknown, except to the Kafirs. It is a general practice to take purging medicines and to draw blood in the spring. Under another subject (see para. 51 and 58) a few places have been mentioned as unhealthy; there now remain very few to be added. There are many diseases in Kushmeer, a fact less owing to an unhealthy air than to filthiness, poverty, and the degraded condition of the inhabitants. The Kashmeerees are at the same time

a robust race, and excelled by none in carrying burdens over mountains. The Huzaras and Oozbucks, especially the former, are broad in their persons, and strong. The water drawn in the interior of Cabul disagrees with strangers, and there is a good deal of sickness among the poor by reason of their being ill accommodated, and the town too closely built, otherwise the climate is not unhealthy, and Peshawur is not inferior to it. Scrofula, a complaint little known in India, is not uncommon among the Daoodzyes, and some other tribes.

89. Khoorasan is undoubtedly a healthy country; and in Toorkistan we can name only a few situations which deserve to be called unhealthy. The most remarkable is Bulkh, which is afflicted with eye-complaints, all species of fevers, consumptions, the Guinea-worm, dropsy, and many other diseases; yet some of its villages have a good air. The most remarkable complaint of Bokhara is the Guinea-worm, which appears in some other situations in the east of Toorkistan and Bactria, in some villages of Candahar, in certain parts of Huzara and of the Pahar-turee of our provinces (see paragraph 71), in Hureeana Haroutee, and many other quarters of India. In all cases it is commonly ascribed to the quality of the water. In Toorkistan the inhabitants of those cities in which it is most prevalent drink from tanks, the water of which is only occasionally renewed. Where running water is to be had the disease disappears; yet I have heard it pretended that there is something in the air of Bokhara which occasions it, and a pleasing story is told of a certain Moolla who was sceptical in this particular. Being persuaded the water only was to blame, he resolved to use none but that of water-melons, and confidently expected to escape; but before he had passed a year in Bokhara he had a number of worms extracted from his body. The only other local complaints deserving of mention is the Goitre, which is now supposed to be the consequence of drinking water impregnated with certain minerals; it is not unknown in Bactria, but its chief seats are the banks of the Kishun Gunga, Sirn, and Pech. The waters of the Uba Seen have somewhat of the same bad quality, and Goitres are common in certain parts of the Gukhur and Khatir countries. It is asserted, that on the banks of the Pech even the dogs and tame birds are affected.

(To be continued.)

Art. II.—*March between Mhow and Saugor*, 1838.

Many of the places visited in this journey, were unavoidably visited (it may be almost said) at a gallop; the descriptions are not therefore offered as minute and faultless details, but rather as sketches claiming every indulgence; whose aim is to stimulate the curiosity of future travellers over the same ground, who may have more leisure to pursue the inquiry. Some apology seems also necessary for the digressive nature of the notes. Their best excuse will be their proving either interesting or instructive. Nothing was observed worth noticing till the fourth march,—unless we except a warm spring* between Duttoda and Oouchade, known by the name of the "Kiaura Koond" from a few of the so-called trees, whose flowers perfume its banks, and which give a title to a Ling temple near it, "Kioureswar."

Some time after leaving Akberpoor, the road crosses a range of low wooded hills, issuing from which the small village of Kurnawud is seen, half-hidden in foliage on the right. It boasts itself to derive its name and origin from one who plays a conspicuous part in the "Bharut," the ear-born son of Kunti—the 6th Pandoo—the gallant and generous Kurun. Not content with the wonderful adventures of which he is the hero in "the great war," the inhabitants of the vicinity possess a goodly store of silly local *cheritras* regarding him, which they eagerly recite, and believe with perhaps a more lively faith, than will elicit from them the more orthodox, but less familiar, fables of Vyasu. One of the legends they told us, was that which is found in Conolly's overland journey,† and the others were of a like stamp. A Ling temple close to the village, honored by the name of the hero, appears—the lower part of it at least—to be of considerable antiquity; though a plastered roof now covers the Subha, and a modern brick dome supplies the place of the doubtless once pyramidal Sikra; the

* Springs of this kind are not uncommon in the offsets of the Vindhya. They rarely are of higher temperature than 80°, and have no remarkable chemical properties.

† Vol. ii. page 286. The story is however not in the Bhagawut. It may possibly be found in the "Kurun Upakian." A Basha poem, the "Gurb Chintamani" describing the inconstancy of human glory, thus speaks of Kurun's charity, and his end, in popular doggrel—

Raja Kurun bihoto
Kunchun khatma deto
He nur murgya chun me
Dera kuryya bun me.

Death has seized as his prey
Kurun, who lavished gold;
Like a spark he passed away;
His grave is in the world.

fragments of which lie scattered around. Among the ruins may be observed a mutilated horse and rider, which perhaps represented Raja Kurun and his steed; a large female bust with three faces; and a head, the size of life, (we searched and inquired in vain for the trunk), having the thick lips and curly looking hair of a Budhist or Jain saint. The latter we incline to believe, since the Jain faith, as will be presently seen, was formerly very prevalent in this neighbourhood, and no traces of Budhism were observed; unless the *trimukhi* be assigned to that sect,—as are by some,* the celebrated *trimurtis* of Elephanta, &c. An Indian Budh too, may generally, (perhaps not invariably,) be distinguished† from that of a *Tirthaukur* by its more elaborate ornaments.‡ There is usually on the crown of the first, a knot which resembles hair collected into a knob; but this knot is often changed into an ornament, evidently attached to a cap,§ probably in some cases made of hair; and which, fitted tight to the skull, covering the bald shaven head, with which Budh priests are so often twitted by Hindoo dramatists.‖ Thus in the "Prabodha Chandu Udaya" (see Wilson's Theatre) Soma Siddhanta calls the Budh, "thou uncombed one." The Budh head-dress is indeed most changeable; but the Jain twenty-four are almost invariably imaged, wearing only the non-increasing locks which forms one of their *atisyas*:¶ these, they are

* Quar. Oriental Journ. No. 14, page 219. Several female *trimurtis* are figured in Raffles' Java.

† There is seldom any difficulty in deciding whether a perfect image is Jain or Budh, though some of the tests recommended are of questionable value. Wilson says, As. Rs. 16; 457, "It is more common to find Jain pontiffs shaded by the snake." Now, though many Budhs, (T. R. A. S. 3; 481—As. Rs. 16; 458 plate—Crawford's Siam, 109—Davy's Ceylon, 468, &c.) and inferior Jain deities, are thus sheltered—Parusnath alone of the Tirthaukurs is shaded by the Nag; and even he is sometimes represented without the hood,—the snake being merely carved at his feet, as the *Sanchun*, or distinguishing mark. Perhaps one of the best tests is the "Sri Butch," which (here at least) is carved on the breast (butchus, the chest) of every Jain image. We have never remarked this symbol so placed on a Budh statue.

‡ Prinsep says the contrary (J. A. S. 5; 485), but the Budh head-dress is not certainly "simple."

§ See the drawings of the Dhyani Budhs, Bombay Trans. vol. 2; or As. Rs. vol. 16.

‖ The shaving of the head among the Hindoos was infamy, As. Rs. 17; 616. That Budh was shaved, we may judge from the curious pantomime practised in Ceylon, Davy 125. Among the living representatives of the saint there would appear to be no fixed rule, as in Du Halde, vol. 2, one Sama is described as having the head shaved, another with curly locks.

¶ A. R. 17; 247, In the only list of *atisyas* at hand, that in the Sri Pal Cheritra, the curling of the locks is not included. Wilson's authority was probably different

often described in their Shastrus as pulling out by handsful: and some Jain pundits have even assured me, that what appears like hair on their statues, is not intended to represent hair, but the naked scalp thus forcibly deprived of it.* Jain saints, however, like the Budhs, sometimes wear a *mookhut*.

On a pilaster to the right, as you enter the temple, is a rudely cut inscription, from which it is to be feared but little light will be thrown on the history of the place; as it merely records, and that indistinctly, the grant during the reign of the liberal and wise Deva Pal, of ground for twenty temples to one Yusheek Pal. The date, A. D. 1158, is a dark period in Malwa history: and Deva Pal, whose name is not to be found in the list of kings, was probably some petty chief, who in those days of anarchy and confusion, raised himself to temporary consequence in this wild part of the country.

Peeplia, three miles from Kurnawud, contains no antiquities, and but one place worth visiting—a Digumbir Jain temple; which as the place is under the tolerant rule of a Rajpoot, (the Raja of Baglee), occupies a conspicuous position in the Bazar, instead of being concealed, as in a Mahratta town, in some obscure alley. It may be here noticed that from this to Saugor, the Jains are chiefly Digumbir, consisting, for the most part, of Pudmavati Pwawurs; which Ginat† is entirely of that class. Switumbirs, as elsewhere remarked, are more commonly met with round Ougein.‡

From Peeplia a road strikes off to Hoshungabad, and the report of antiquities at the first march induced us to deviate so far. We found

* Modern Jain priests, as far as I can learn, have no fixed rule of wearing their hair. They generally shave it in front, and allow it to grow long behind. But Dhoondias, Soomegis, and a few Gooroos and Juttes eradicate the hair, though not in the Panch Mooshti fashion of their ancestors, only plucking them out occasionally, as for instance once a year, tenderly, and one by one. Budh priests have, if I mistake not, in all countries always shaved their heads, Davy 296, 210, 219. Carous, Japan, Crawford, Mandeus, M. Polo 253 and note. When a Jutti adopts *achela* he shaves all the hair off the child's head, except one lock, which it is the Gooroo's part to pull out (*lachun.*) The Digumbir sannyasis of the south never shave A. R. 9. 284.

† गीनात So vulgarly spelt and pronounced. Miles writes the word *Nat*: Tod, *Nyat*: Sanscrit ज्ञाति.

‡ That is taking Ougein as a centre, and giving the circle a radius of forty miles: but north of Ougein, Visnooi Buniahs outnumber the Jains. From Rutlam the Digumbirs begin to increase; and from Banswarra to the Aravulli, hardly any other tribe is to be met with but Digumbir Hoomurs. Guzerat, Marwar, and north Mewar are the chief seats of the Switumbirs.

however, only some Jain statues, eight or ten feet high, a few lying in the miserable village; the best on the top of a hill, which overhangs it. The temples which once sheltered them, of which there were the ruins of three or four on the hill, have long been thrown down; but we could calculate their age with sufficient precision; for, though the weather-worn inscriptions on the plinths of the statues were illegible, the date 11th or perhaps 12th could be traced. We made out but one *Sanchun*, the deer of Santinath.*

Whether these images are Digumbir or Switumbir, it is impossible to say, for all statues of the twenty-four are Digumbir, or at least naked. Some Switumbirs indeed pretend that *their* statues may be detected by a string (Kundora) round the loins—a doubtful proof, since the wrinkles of the belly are very likely to be mistaken for it. All,† whether Digumbir, or Switumbir, have as before remarked, the *Sri butch*,‡ with which mark the future Tirthaukur is said to be distinguished at his birth. In fact there is not any positive distinction between the undressed images, as is proved by some of them—the celebrated Rikhabnath near Doongerpoor for instance—being claimed by both sects. Tod's remark (Raj. 2; 744) which seems to argue the contrary, may be safely taken as a flourish.

Though the antiquities of Bijwar proved so little interesting, the excursion was altogether pleasant enough. One of our party, a Jutti, was in high delight as we neared his native place Baglee, which he had not visited for twenty years, though he had been all that time at Indore. It was amusing to watch the eagerness, with which he recognized every old hut, mata, or tree, to most of which some

* The Sanchun is frequently omitted on old Jain statues, and sometimes, but more rarely, on modern ones. In such cases the saint represented must be guessed at.

† It must be confessed, however, that the Digumbir figures As. Rs. vol. 9, are without it.

‡ The *Sri butch*, which is generally painted as a flower, but carved on an image as if a square ◇ is one of the Jain Asht Mungliks, or eight auspicious symbols, which slightly differ from those of the Budhs. As. R. 16, 460. They are represented in drawing (A.) a copy from a small brass table, sometimes placed before a saint, as a kind of altar. It was picked up by me at a fair, from the miscellaneous rubbish of a Bohra's shop, and may have been plundered from some old temple. At the back is scratched the date 1167. The signs, according to the Jiva Bhagawut Sutra, 3rd Kund, are the,—1st Swastica,—2nd Sri Butch,—3rd Nandivertha,—4th Censer,—5th Throne,—6th Kullus, (or water) —or 7th the Fish,—8th Looking-glass. The Sri Butch occasionally carved on images of Krishna seems somewhat different from the Jain mark,—if indeed I mistake not in supposing the former to be synonymous with the Briguluta, As. R. 16, 461; Prem Sagur 88.

tradition was attached, or a story of the bad old times of the Pindaries. He shewed us, *inter alia*, after much searching, an old Mhowa tree by the road side, the hollow trunk of which was full of water. This he challenged us to empty. "Fill your lotas," he cried out triumphantly, (for we had often before received rather incredulously his tales of this very tree) "fill your lotas all day long, and there will still remain a cupful for the next comer." As the water is sweet, and the hole covered, a spring perhaps rises under this new species of *Arbre voyageur*. A similar reservoir is described in the Journal of the Bor Khampti expedition.

The Raja of Baglee honored us with a visit, and finding that we were curious in such matters, gave a short sketch of his history, and desired the Kool Gooroo, to extract from his papers, any thing they might contain regarding the family. The Raja would seem from his putravali to be a Champawut* Rahtore. We could not learn the date of the emigration of his ancestors: and indeed the history of the family is but a barren list of names, till we come to Kakul Das; who, in the middle of the last century, served with a few followers under the Bhopal Nawaubs.

The popular account, of how the strangers first obtained land, appears more romantic than probable. The Nuwaub stuck some very small object, (tradition says a peppercorn,) on the top of a pole, and offered a reward, for whoever should knock it off, without hitting the pole. All having failed, Suktawut Gee, the wife of Salim Sing, the youngest son of Kokul Das' four sons, stepped out, and at the first shot performed the feat: for this, the village of Bamun Kheri was given to her in enam. Baglee, three coss from Bamun Kheri, was at this time in the possession of a Chohan Grassya, named Banki Rao; who instead of attending to his interests, amused himself daily with boating on a tank, about a mile from Baglee, called the Koomptalao. Salim Sing, taking advantage of this negligence, attacked and took the fort, while its master was absent; and though the expelled chief made one desperate effort to recover it, he was driven back, and the Rahtores have ever since kept the place.† To confirm their power they

* The Gooroo's tables commence with ten names prior to Jya Chund, the last king of Canoge; none of which, except the penult have any resemblance to those in Tod's list, or in the new lists elicited from coins, &c. Two princes, Birda Sing and Jutaran, connect Jya Chund with Seoji; from whom, to Rinmull the names, (allowing for provincial spelling,) strictly correspond with Tod. After Rinmull, comes his third son Champa, from whose time, the catalogue is evidently defective,—seven names occupying a period of more than 300 years.

† The turned-out Grassya's family still reside, I am told, at Mukhsi, a celebrated Jain Tiruth near Ougein, and receive through our mediation some small annuity.

offered themselves as tributaries to Scindia, and with the usual activity of new settlers, soon cleared away large tracts of the forest; so that when we came to the country, about sixty years* after the first conquest, they were lords of as many villages. The present Raja, Bheem Sing, is the son of Salim Sing.

From Bijwar, Ashta may be reached by a difficult pass over a range of hills of considerable height. At a village called Magherda, half way, a few handsome Jain statues have been collected and enshrined in a low walled court, some fourteen feet square; where they are worshipped by the ignorant piety of the villagers as *matas*. The court we should have supposed to be a "*bettu*" (A. R. 9; 285), did not that description of temple seem to be peculiar to the Jains of the south. On one of the stones of the wall, there was an inscription in modern Nagari. It was placed at an inconvenient height, and as we were pressed for time, and it evidently contained no date, we did not copy it. The image, which misled the inhabitants of the village, was doubtless a Pudmavati;† who occupies the principal place, while Santinath and some other saints, sit around her; nor could the rustics be expected to know whom this figure represented: for, as is worthy of remark, the lesser Jain deities are rarely to be found amongst ancient ruins; inducing the belief, that their admittance into temples is a modern innovation.

The name of "Deo Burno," the Hill of Gods, and the hope-inspiring intelligence of a large "Kumbh," tempted us to make a run from Ashta to a village named Belpan, about fourteen miles north-west of it, and situated close to the boasted Tiruth. On this spot we were assured we should literally find one mass of deities, "tantum statuarum ut alter populus lapidens videretur"—and to give us some notion of the number of the images, (many of which were said to be milk-maids, turned into stone while milking), they borrowed a fable very popular at Kasi; where you are told that one maund of rice will not suffice the worshipper, who should wish to drop only one grain at each shrine.

* The exact date of the taking of the fort we could not learn; they said the beginning of the current Sumvut.

† Pudmavati you are acquainted with from a notice in the T.R.A.S. but of the forms and legends of the numerous *Dii minores* of the Jain Pantheon very little seems to be known. It is however very necessary to be *au fait* on these subjects before visiting Jain temples, as they are frequently covered with mythological paintings. I had proposed giving some account of the more common ones, but fear I must now abandon the design. They might possibly have been useful in decyphering the ancient Budh paintings.

Of course this report, like every such report, was fabulous. All we saw on the hill, were a few Vishnooi ruins, temples, and broken statues; some of the latter however exquisitely carved. The supposed milk-maids we found to be a mutilated group of Dytes and Deotas churning the ocean, with mount Mundar and Vasooki. The only temple at present in preservation, or hallowed, is a cave,—from the floor of which, a languid spring issues, filling a small square tank built about it. The water was muddy and not drinkable: but the fount, we were told, sometimes supplied a sweeter beverage,—the pilgrims who assemble here once or twice in the year using no other. Some of the sculptures of the cave, (now sacred to Sheo,) perhaps indicate that it had once been dedicated to Vishnoo,—a very common metamorphosis in South Malwa, seeming to prove the priority of the latter worship in these parts. The Kumbh was merely a large Jain statue at the foot of the hill.

At a village called Gundawul, about five coss from Belpan, there are several ruined Jain temples, two or three large Jain images, called here by the deceptive name of Kumbh, and a Ling mundir, in which stands an image of Gundrub Sein in his human shape, with an ass's head; there too Vishnoo seems formerly to have reigned, from the sculptures of the Autars about the temple. These places are worth visiting, were it only for the fine bur trees which luxuriate in every village.

The sight of these was the more pleasing, in consequence of their scarcity in the higher ground about Mhow; whilst in this neighbourhood they are remarkable for their size and beauty. In the latter quality, one at Newri is said to bear the palm; and another at Untralo near Ashta is very celebrated—but the largest forms the boast of Belpan; though very lofty it already covers a space of 400 paces, and will doubtless spread much further—for remarking that it had encroached on a field, we said to the owner, who was weeding, "You must lop off some of the branches of this tree, or your khēt will be destroyed." "By no means," he replied, "'Tis a God, and walks where it lists."

In the villages of this neighbourhood, you meet with a great variety of Rajpoot tribes,—Bhattis, Seesodias, Solankes, &c.; a fact accounted for, by the matrimonial custom of a foreign bride being attended by a few of her brethren, who follow her fortunes, and settle in the country of her husband. It is, to me, quite inexplicable, how in the confusion of names, the Rajpoot crime of incest can be avoided; since (not to mention the Sachas) many of the minor branches even

the Otes and Awuts of the great families, are constantly confounded with their roots, and you will hardly ever get a list of the so-called 36, from a Bhat of this quarter, without his including in it the Chondawuts and Suktawuts, and increasing the number of names to 50, 60, or more. The most respectable of these classes themselves, petty rajas, potails, &c. are in the highest degree ignorant of their heraldry,—presenting in this respect a striking contrast to the purer Rajpoots of Mewar; a large proportion of whom have the *gotra acharya* at their finger ends; while many will repeat the names of their ancestors for ages back.*

From Ashta to *Sehore* we found nothing deserving mention; but the antiquity ascribed by Tod to Bhopal, stimulated our zeal to search for Budh relics: and we began to indulge in visions of success, on finding a statue of that sect by the road side, half way between *Sehore* and Bhopal—and on being told, that the hills round the city abounded in caves, in some of which we should find inscriptions: yet, after all, our hopes were not realized. The inscriptions in the caves, which were all in modern Nagari, proved to be chiefly dates, names, and prenams, excepting a few of greater length; only one of which however was at all decypherable.† The caves, mere cavities without carving, have a few of them been walled in and inhabited. In one near the old fort, a fakir lately made himself a very cosey dwelling place; but the superstitious women of the town so pestered him, that he fairly ran away from them.

The first impression of a stranger on visiting the city, will be by no means a favourable one. It is entered,—either by a hard, uneven, rocky way (road it cannot be called) with considerable risk to one's horse's knees,—or through heavy sand and mud; for the sandstone when once broken, soon crumbles to dust, and no one will take the trouble of making a firm road, from the trap and kankur which might be easily brought from the neighbourhood. Being built on a hill, there is hardly a public level space in the whole town, with the exception of a spot used as a manège, little bigger than a London riding school; and the narrow streets are choked with dirt.

* Some of the Jain heads of colleges have astonishing memories on these matters, and assisted by a Memoria Technica will repeat such long lists of names—of their *acharyas* for instance, or the minute divisions of the *ginats*—and such whole volumes of verse and prose, as to reconcile our faith to the almost incredible accounts of the oral preservation of their learning, by the Budhs, the Druids, and the Greeks.

† Insc: No 2. It is hardly worth sending, but to shew the modern character.

The city however, especially if viewed from a height, has a remarkably lively and pleasing appearance: white terraced palaces, and the light domes and minarets of mosques and tombs, peer above the houses in every direction. The rock-bound lake washes the town, and little outworks from the fort, (which has perhaps more of beauty than of strength)* stretch to the water's brink, and add much to the picturesque of the scene. Nor must we forget to notice the gardens filled with fine trees, and the really splendid baolees, containing numerous shady apartments for the convenience of the traveller. Some of the mosques, &c. may in after times yield matter for the antiquary: for, the Mussulman,—"non in aliâ re damnosior quam in ædificando"—not content with mutilating the detested images, is every day using them as material for his buildings, turning the sculptured part within.† A few days before our arrival, a stone tablet from some old temple, in the neighbourhood, containing, it is said, a long inscription, was buried under the foundation of a splendid musjed which the Begum is erecting:‡ another slab was about to suffer a similar fate,—the authors of the sacrilege being in this last instance Jains, but a copy of the inscription was taken before its consignment to earth. Captain Burt has I believe sent it you.§ As Bhopal is encircled with ruined towns, thefts of this nature are committed very generally by all classes, stones being frequently brought from so great a distance as Bhojpoor.

We could not visit all these ruins; so we preferred passing by Shumsgur, from which the two *bijeks* above alluded to were brought, and which as the nearest to the city, has been the common quarry for ages. We set out in high hopes, for a village, (of which the name has escaped me,) about eleven miles off; which was fabled to possess a marble stone,—Heaven knows, how many yards square,—covered all over with writing. On arriving at the place, the stone was not to be found; and though we teased every soul in the village with questions,

* Both the fort and citadel are contemptible as fortifications, spite of the famous siege.

† A common practice, J.A.S. 3; 618. Mrs. Meer Hussun, 2; 138, &c.

‡ A buniah who had seen it, consoled us by the assurance that it was about 6 or 700 years old, and related to some Raja or town named Bid (?). That he could read it at all —proves that it was modern.

§ A fragment (No. 3.) that you may verify it is forwarded. We delayed taking a facsimile till our return from Saugor, in the interim a piece which had been chipped off one corner, was lost. We can make no sense of it, though the letters seem plain enough.

no one had ever heard of such a thing. Bhojpoor, four miles further on, was, according to Tod, an ancient Policity ; the present name must therefore be modern, and is probably derived,—not from the more ancient Bhoj, of whom the old song tells

"Rajah Bhojho bari
Vedya Jan to sari"—

but from his scarcely less celebrated namesake—the historical puzzle—the father of Udayaditya.* In support of this supposition, we have the following traditionary fragment—here in every one's mouth—which at least proves, that the only building of consequence at Bhojpoor, was erected at about the period of this later Bhoj, and not improbably to his honor, by his son Udayaditya. It sounds like broken verse, but we could never get the couplet completed.

Muchalpoor ka baolee our Bhojpore ka kumbh,
Udayapoor ka dehura (were built by one man,)

Now for the architect of the temple of Udayapur, we have, as will be presently seen, the certain date of A. D. 1049, and there is in the buildings themselves (in the two at least which I have seen) a certain conformity in boldness and grandeur of design, justifying the tradition, which attributes them to one master mind.

The temple of Bhojpoor would be admired in any country. In the centre of a lofty chamber, about thirty-five or forty feet square,† whose light and elegant dome is supported on the four far famed kumbhas, and on a handsome pedestal, stands Deus Loci, a Ling.

It is the peculiar excellence of this building that though the whole is of massive form and material, the parts have been so nicely proportioned and blended together, that it presents an admirable appearance of combined solidity and airiness. Thus for instance, the platform of the Ling is 21½ feet square, and about *ten* feet high—a bulk, which if solid, would be out of all proportion to the size of the temple; but the architect has escaped this reproach, by simply giving it a light and elegant shape. The sketch, though from memory, will serve to explain the plan of it: the lower table is formed of four stones, so neatly fitted together without cement, that it is a point of faith in the neighbour-

* We postpone our remarks on this riddle, till we shall reach Udayapur, where there is a long inscription bearing upon the question—but not deciding it. Since writing this, the inscription has been noticed, J. A. S. 7 : 1056. I cannot at this place refer to the original to redeem my pledge.

† Some of my pencil notes of this place are effaced, the doubtful measurements are therefore put in italics, the others in figures.

hood to believe them one huge slab. The two upper stories, (if they may be so called,) are similarly composed, and are but little, if at all, less in size; but I need hardly point out, how much the rounding of the edges, and the consequent cushion-like appearance, and even the ornaments at the corners of the upper table, relieve the heaviness, which would seem inseparable from such large blocks of stone. The idol is reached by steps, which being on one side, and half concealed by one of the pillars as you enter, do not detract from the effect of the *coup d'œil;* and this noble and seemingly insulated throne of rock, crowned by a Ling 7½ feet high and 17 feet 8 inches in circumference, so well accords with the dark pillars which bound it, that it can hardly fail to impose on the approaching worshipper a mixed feeling of awe and admiration. The art of the architect is again displayed in the pillars. It was desirable to adapt them, in some measure, to the necessarily confined boundary of walls, without detracting from their solid grandeur. This has been effected in an ingenious manner. The shaft, (which, if I remember rightly,) rises from a base *six* feet square, is divided into three nearly equal sections. Of these the lower is an octagon, each of whose sides measures 2¼ feet; the sides of the second, also an octagon, are somewhat narrower, or about 2⅛ feet; the third has 24 sides, of a little *less* than 2 feet; so that the pillars have the appearance of tapering, while in reality they are nearly of the same thickness throughout. Even after this, the pillars would have but a gloomy look, were it not for the door-way, which, unlike the usual entrance to a temple, occupies nearly the whole of one of the sides of the square. This entrance, it is true, seems to have been enlarged by violence, but it was evidently from the first, lofty and spacious.

The simplicity,—which has been religiously preserved in the walls of hewn stone, in the unornamented pillars, and the plain pedestal of the Ling,—was exchanged in the upper part of the temple for rich and elaborate carving. The dome seems to have been one mass of ornament. I say seems, for alas the barbarian has not spared this beautiful structure, and all that remains of the roof are the sculptured edges. Under the shelter of this fragment, a mere narrow rim, and clustering on the projecting cornices, numerous families of bees have taken up their abode, whose never-silent humming, re-echoed from the hollows, struck me as in melancholy unison with the solemn ruin. We counted no less than fifty-two of their black nests. Never robbed of their honey, and accustomed to the crowds, who at certain seasons assemble to pay their devotions to Bhojeswar, these insects are not the least alarmed or irritated by the noise of strangers, nor even by smoke, to which bees

are in general so averse; and though at first, it is not a little alarming to find them falling every instant on your face and person, as they get disabled in their constant battles above; yet they never sting, and you soon become accustomed to their buzzing around, and crawling about you. If once provoked however, their vengeance is dreadful; and the chief of a Math of Gosains attached to the temple, assured me that on some few occasions when this has happened, it was not safe to approach the place for days. He likewise hinted that if a persecutor of their master approached the Ling, Mahadeo's Fouj would instantly detect him, and probably sting him to death. A Moonshi with us had laughed at the story; but just at this moment the wind grew high, and the scattered insects were blown about our faces in hundreds: our Mussulman friend evidently thought they had found him out, and much to our amusement, and most especially that of the Mahunt, we observed him quietly stealing off, and saluted him with a peal of laughter.

The Gosains of the Math, above alluded to, reside in a small court in front of the temple. As usual in these monasteries they were very civil and communicative, and though now poor,* (the few lands on which they have rights affording little else but pasturage,) boasted largely of their former fortunes, and assured us that the establishment was of a very ancient date; an assertion in some measure borne out by several venerable looking Samadhs, the graves of former Mahunts. They pretend indeed that the Apsara was founded by Bhoj, or that at least it was coeval with the temple; which claims may not be credited, but cannot be disproved,—all the papers and grants of the Society having been lost (in a fire, I think) many years ago; which leaves the question in a convenient uncertainty.†

Bhojpoor is at present a small poor village of mud huts, and if we may judge from the scantiness of its ruins, was never a town of any size or consequence. The only building worth visiting besides Bhojeswar, is a Jain temple, remarkable for an image twenty feet high. Statues, of such large dimensions are approached, to be worshipped, by stone steps, which are built close to the wall on either side of the

* I think the Mahunt calculated the yearly value of the lands at 750 rupees; the actual members of the establishment are about 30,—the residents not more than 10 or 12.

† Hyat Mahomed of Bhopal renewed their Sunnuds (we could not however get a sight of the Tambaputras,) and from his time only their history can be depended upon. They read to us the list of Mahunts, all whose names have the distinctive termination of Bun.

saints. In talking of these steps I carelessly made use of the word "siri," (instead of paoria or pugtia,) much to the horror of my companion, a Jutti. The incorrectness of the term as applied to *stone* steps, he said was a trifle, but the word itself was unlucky, and of bad omen, which to pronounce in a temple, was almost sacrilege, and to pronounce any where was a breach of good manners, as it is the name of the bier on which a corpse is carried. Close to the Jain temple, (Mr. Wilkinson informs me) there is a cavity in the earth, from which a warm air issues; unfortunately our guide, either stupid or sulky, failed to tell us of the phenomenon, and we lost the opportunity of examining its nature.

Continuing our journey in a southerly direction, some singular looking masses of black rock, cresting a high hill to the right of the road, attracted our attention. They are known by the name, (common in all parts of India to such seemingly art-shaped stones,) of the Pandu, Bhim; and though worshipped by the country folks, (who celebrate fairs there some once or twice a year,) are, we were assured by our guide, mere natural rocks, unfashioned into their present pillar-like form by human hands, and not sanctified by any ancient images or sculpture. A personal verification of the point would have been more satisfactory, but we were obliged to take our informant at his word; as though from their conspicuous position on the brow of the hill they appeared quite close, they were at least nine miles off, and our time only admitted of going as far as Asapuri, two miles from Bhojpoor.

This village should be visited for some very beautiful Vishnooi images; which though their temples have been thrown down by some zealous servants of Mahommud or perhaps of Sheo, are themselves generally unharmed, being concealed and protected by the huge stone beams of their roofs, which seem purposely to have been allowed to fall over them, and under which you must creep to view them. The scattered ruins are richly sculptured, but we will merely specify some of the principal images.

1st. Bhoot Nath Gee, so our guide named it, probably incorrectly; as Bhoot Nath is a form of Mahadeo, and here every thing seems Vishnooi. My pundit called the figure Hunuman, but the tail was wanting.

2nd. A highly ornamented image, the size of life of probably Indrajit, with a pair of ankleted feet in front; near it a Varaha.*

* The worship of Indrajit, or Megh Nath, seems (as will be seen in the sequel) to be popular in these parts. One of the most beautiful temples in Malwa, and the chief view at Wane, is a shrine of Indrajit.

3rd. A Shesh Sohai, sculptured with admirable skill and taste. On a table supported,—at the back, by the stalks of the lotus,—in front on the heads of worshippers,—lies folded the Nag, whose hood shades, as its body furnishes a bed for, the sleeping Bhugwan. The god is represented as Chatoor Bhooja, and is surrounded by attendants, choristers, &c. In front kneels, expecting his waking, Luchmi; before the image are the Churrun, two pair of which are also sculptured on a loose square stone near it.

4th. A curious image of the "Fulfiller of Hope," from whom the village takes its name; her immense breasts distinguish her as the Indian Juno Lucina.

The drawing represents a small conical cup or basket which appears to issue from her thigh: out of it peeps forth a child's face, round which the edges of the cup closely fitting, have much the appearance of a baby's cap.

On the other side of the village lie the ruins of what must have been a very large Jain temple: jungle, and thorns had grown over them; crawling among which, not without difficulty and pain, we discovered,—a statue of Santinath, standing sixteen feet high, a large sitting figure without *sanchun*,—and many smaller images.

At a village near this, we were received with the country welcome of the *kullus*; a few women brought two lotas of water, one put over the other, with a pân leaf at the top, and placing them at our feet, began singing a song, which they expect one to reward by dropping a trifle into the kullus. The officiators at this little ceremony are usually those of the lower Jats, such as live in the outskirts of towns, near which they take a position when a great man is passing on any particular occasion, standing silent with their lotas on their heads. They thus waited outside Maheswar, when Hurry Holkar escaped from his prison. Occupied with more important matters, or perhaps having no superfluous cash, he passed them all, it is said, without notice, merely dropping one rupee into the last kullus. This so unusual a proceeding was considered most impolitic; the old crones in the neighbourhood shook their heads, and prophesied all manner of evil; and a failure would have been doubtless looked upon as omened by, or consequent on, this ill-timed parsimony. To pay this compliment (kullus budhana) is a not uncommon practice; Tod and others allude to it.*

* Near Purra and Saush in Afghanistan the old ladies have a less agreeable custom, though somewhat similar to this—they throw water over the traveller and his horse as he approaches, to guard him from the evil eye.

From Bhopal to Sanchi, the villages, (inhabited by Gonds, miserable in appearance, and sunk in the grossest ignorance) will afford but few ruins, on which the antiquary can exercise his fancy or judgment. Even the temples elsewhere so common, are seldom found here; or if found, have but little *pooja* made in them, in lieu of the more generally worshipped Deotas of the country—the Bairawas, Lings, and Matas. The villagers pay their adoration to a parcel of small stones arranged in a square or circle, forming walled enclosures of a few yards, with a small gap for an entrance, the stones opposite which, from their larger share of paint, seem the principal objects of pooja. These gods, with a curious contradiction, (for the stones are rarely so high as a foot,) they call the Burra Deos; and though they pay a general reverence to the Hindoo Pantheon—for as one of them told me, once a year a goat dies (bukri murta) to Kali—these are the powers to whom they look, in the hour of joy or sorrow, round whom they wind the votive thread,* before whom they throw the marriage *mour*†, and hang up the old plough at the *singust*.‡ In one of these inclosures we remarked several clubs set up, and on asking the cause, were told that finding all prayers and ceremonies ineffectual to stop a sickness which afflicted the neighbourhood at the commencement of this year, they had determined to threaten the great gods with a beating; and sickness having shortly afterwards ceased, they believe their remedy to have been efficacious.§ At one village, Sahapoor, two miles south-east from the halting place between Bhopal and Bhilsa we were shewn about forty or fifty (unfortunately we forgot to count) figures of horsemen carved in sandstone, about a foot and a half high, and ranged round a small walled inclosure in an oval; of the warriors who

* Made of threads, and commonly seen encircling Lings. The grateful piety of mothers whose infants have survived the small-pox, generally prompts this simple form of devotion.

† The caps made of split date leaf, or false jewellery, of a Hindu bride and bridegroom. When a river is at hand, they are generally thrown into it, otherwise at the feet of some deity. The custom, doubtless of great antiquity, may be traced in other countries—and as one of the many coincidences between Yavan and Hindu manners, which seem to argue a common origin, we may notice the resemblance of the *Sehura* of an Indian maiden, to the tinsel cap of the Athenian bride.

‡ The old plough alone is thus gratefully honored (the iron however taken off) every twelfth year, other worn out articles, brooms, baskets, ghurras, &c. are merely thrown out in a heap.

§ A method of managing the gods of which there is a well known example in History, and one still practised by some of the hill tribes of India.

rode the horses (many of which are richly housed in the native fashion) the legs and spears, and a few heads which lie at the feet of the chargers, alone remain. Not one *body* was to be found, which renders it probable that these fragments have been brought from some other place. We eagerly inquired of the villagers where they came from, their names, their history, and whether there were any more such statues in the neighbourhood: no one was able to give us the slightest information. At last to our reiterated questions, and promises of reward to whoever would shew us any temples—any Deos—a lad replied that he would be our guide to a big god. We toiled after him over several fields, doubting, guessing, and hoping, till he stopped and pointed with a grin (I really believe the half-idiot-looking rogue knew that he was taking us in) to what in our zeal we had quite forgot—the circle of little stones, the Burra Deos. Though we were thus unsuccessful, I am by no means satisfied that a more extended investigation than our time permitted, would not have brought to light some temples or monuments with which these figures were associated, and which might afford some clue to their object and history.* We only saw one other statue of a horse in this neighbourhood, that of which mention has already been made in the Society's Journal.† It stands unconnected with any other sculpture on the hill from which it has been cut, at a village a mile south-south-west from Sanchi. Supposing these horses to have been originally placed in their present position, several explanations of their history offer themselves, but none that seem to me sufficient; thus, for instance, in Mussulman *astanas*, hundreds of small horses with riders are heaped together in honor of Alexander; but the horses thus offered, are rudely made of burnt clay, while those be-

* Accompanying is a drawing of one of the images, which we brought away, as the villagers pay them no respect. The walled inclosure rather resembled the ruins of a hut than a place built expressly to receive them.

† Journal Asiatic Society 3; 489, where the *m* of the plan should point S.S.W. instead of S.E. It was buried in earth, all but the head and upper part of the back, and had been so, said the oldest inhabitants of the village, as long as they could remember. Two men cleared out its grave in about 12 hours, and brought to light a rudely fashioned, unornamented figure 12½ feet from head to tail, about 10 feet high, with a head 2½ feet long. The neck and belly are clumsily supported on two columns (if I may so call them) of this shape ⏢ which are cut out of, and still adhere to, the same block of stone from which the horse is carved. On the recess were scratched, rather than engraved, two marks ⟨ ⌋ The other image at the same place, alluded to in the Journal, is modern and Braminical.

fore us are carefully carved and ornamented ; and such *astanas* seem peculiar to the south of India.*

The dread of villagers, Shaka Siam,† is represented on horseback with a long spear, as is the Deccan favorite Kundee Rao, and Pabooji, whose picture may be seen in Tod, and Ramdeo, a Marwari incarnation of Krishn, and many others : or we should at once have set them down as the twenty-four Bagrawuts,‡ had not the worship of those worthies been peculiar to Mewar and the countries near it. It would be a mere waste of time and paper to notice the various forms and seasons in which the horse is worshipped in India ; we will not therefore weary you with a vain parade of research, but content ourselves with

* As are a large proportion of the customs described in the Quanoon-i-Islam, quod vide page 279.

† A corruption probably of Saka Swami, the Lord of Slaughter, for he is principally worshipped, I am told, on fields where a battle has been fought. His statues are more commonly found in company with those of brother spirits, as Goga, Phurna Gee, &c. but he is said to have a temple to himself, at Nursinghur near Bersiah. The following story related to us by an old villager, will remind you of the black rider of the Hartz. A buniah had to return home from a Mela, but the gains of the day were in his purse—night was coming on—the road was of bad repute, and he feared to go alone. A soldier passing by, offered himself as an escort—No, objected the buniah, you are armed, and I am weak ; you yourself may rob me. Anxious however to get home, and encouraged by reiterated assurances of protection, he agreed to trust himself in the stranger's company, provided he would swear by Shaka Siam to do him no injury. Shaka Siam is between us (*beechmen*) replied the soldier ; but no sooner was the village out of sight, than he robbed the unhappy merchant of not only his money but his clothes, tauntingly exclaiming, Where is your Shaka Siam ? if he be between us why does he not assist you ? Hardly had the words passed his lips, when a tall horseman was seen in the distance—his jet black steed outstripped the wind—one moment, and the soldier was transfixed by the lance of the rider. The poor buniah had closed his eyes in terror—when he looked up, the horseman had vanished—the soldier lay dead at his feet.

‡ That very singular class of people, the Bhopas, who are the Pundas (poojaris) of most of the heroes I have enumerated, carry round the villages a long cloth called a *phow* फउ (similar to the *puts* for which Juggernath is celebrated) on which the history of the twenty-four brothers is painted in glaring colours. I have one six feet long, and a yard high, which, if a novelty, I propose offering to the Society's acceptance ; annexing to it the explanatory legends, which though Tod seems to have thought them unworthy of record, are indispensable to one who wishes to understand the theology of these regions. Pabooji has a *phur* to himself, which shall also be sent if acceptable : of Ram Deo and his worship a description is deferred to another occasion. Tod's Rajastr. I, 730. 2, 759. [I sent this down to the Society a year ago, but have not heard of its arrival. The rest of my engagements I must beg to renounce ; the fulfilling of them is here impossible.]

citing one instance of the superstition which seems to have some connection with the point we are discussing. In the old Happa Raj, a number of brass images, with horses heads, are ranged on the top of a mountain, and held in great veneration: they seem, says Tod,* to mark the site of some victory. Till a better explanation be suggested, we may suppose our images to be something of this nature, and ascribe them (*a la mode de* Tod and Wilford) to the Hihyas, who anciently dwelt in this neighbourhood; though perhaps the horse-worship was rather the characteristic of the children of the sun.

Art. III.—*On an Aerolite presented to the Society.*

A short time before the Cabul expedition, I procured through the kindness of the Resident at Indore an Aerolite, which had then lately fallen near Ougein, and of which I have the honor to request the Society's acceptance. Being at the time the stone fell, laid up with fever, I was not able, as I could have wished, to visit the spot on which it lighted, but intelligent persons were sent to report, who gave the following information.

On Sunday the 2nd of Asar (sudi) two stones fell from the sky at the village of Doondhoo Dabun, belonging to Manik Chund, Kaith, seven coss from Ougein on the Burnuggur road.

It was about nine o'clock in the morning, when a few claps of thunder were heard, but there was no rain: (or to translate my informant's letter literally, a dry cloud thundered once or twice.) Immediately afterwards a sound reached our ears, and we learnt that two stones had fallen, one 200 paces from a Gosaeen's baolee, near the east quarter of the village, the other a stone's throw from the baolee, in a field belonging to Khusal Patail. The last stone dropped one hour and a quarter after the other. Three men were ploughing close to where it fell, who running up to the spot, found that the stone had gone two *háts* deep in the earth, which had dried up for more than a foot on all sides of the cavity, though the whole ground and beyond that was wet.

* Tod's Raj. 2, 303. A horse seems to have been an almost universal type of victory, of which the white horse vale in Berkshire is one well known instance. A number of brass images of horses are scattered about Aboo, A. R. 16, 298. The Bheels, says Sir J. Malcolm, make small mud images of horses; see T. R. A. S. 1, 72.

Of these two stones, the smaller (which however when brought to me was nearly the size of a man's head) is the one sent to the Society. A few pieces have been chipped off for specimens. There is nothing peculiar in its appearance. The inside is of the usual grey colour, with here and there small pyrites intermixed. The outside was of a pale brown, and smooth all round. The villagers smeared it over with ochre of which the stain has remained. The other stone has, I understand, had a temple raised over it, at the spot where it dropped. On the same day, a stone fell at Sursanoo (a coss and a half off from Ghorabund) in the Pergunna of Burnuggur, to which last place it has been taken and enshrined as a Ling.

I could not learn that any meteoric light attended the fall of these Aerolites.*

ART. IV.—*Extracts from the Mohit (the Ocean), a Turkish work on Navigation in the Indian Seas. Translated and communicated by* JOSEPH VON HAMMER, BARON PURGESTALL, *Aulic Counsellor, and Professor of Oriental Languages at Vienna, &c. &c.*

(Continued from vol. — p —.)

SECOND CHAPTER.

أُس Of the fundament (Oss) which is generally used of the Solar and Lunar years —the Roman, the Coptian, and Persian year——in seven Sections.

SECTION I. *Of the Lunar and Solar years.*

The solar year is of 354 a fifth and a sixth part of a day, and has twelve months (alternatively), one perfect, and the other deficient; if the last month is also a perfect one of thirty days, the year is an intercalar one, the regular alternation in the middle way.

SECTION II. *Of the fundament of the Lunar years.*

باقي كه التمش فالو (1)

راني دو روه ضرب ايده سين

The way of obtaining it is to subtract from the years of the *Hedjrat* the imperfect year; for example, of the year 961, you subtract one, and multiply the rest, which is sixty, with four; (1) calling the result *Mahssool* (product);

* See Journal Asiatic Society, 7. 668.

قسمت خارج (2) lay this beside, multiply again sixty with eleven, divide what you obtain with thirty, and add the issue (2) of the division to the *Mahssool;* if that what remains of the thirty, is less than nineteen it is not counted, if it is more it is counted for thirty. The *Mahssool* and what issues by the division in seven parts, what remains is called the fundament (3).

اُس (3)

اُس سبع If there be no fraction, it is called *fundament of the seven.* The beginning is from Tuesday, and the day with which the calculation ends is the first *Moharrem* of the year. If you wish to know the first day of any other month, you must count each two months of the lunar ones for three, viz. the first for two, and the second for one; subtract them of the lunar fundament; if it exceeds seven, that number and the rest gives the fundament; if it is no fraction it is again *the fundament of seven;* the day to begin with is Tuesday, on the last day is the first of the month inquired for. For example, if you wish to know the first of *Moharrem* of the year 961, throw away the hundreds, (900) ماندن and from the rest one; multiply the rest (4) with four, which makes 240; this is called the *Mahssool;* multiply again sixty with eleven, which gives 660; divide it with 30, the quotient is 22, which added to the *Mahssool* gives 262; if you divide this with seven, there remains *three* for the fundament, beginning with Tuesday, the last day is Thursday, which proves to be the first of Moharrem.

کسو ر د ن (4)
which I suppose
stands for قصورندن

Now if you wish to know the first day of any other month, for example the first of *Ramasan,* begin to count from Moharrem, which gives eight months, counting Moharrem for two, *Isafer* for one, and so on (the first month counting for two, the second for one) so the above eight gives twelve; add to it the fundament of this year (3) you obtain 15; subtracting from it the seven (contained therein twice) remains one. Beginning again to count from Tuesday, you arrive at the end again to Tuesday, which is the first of Ramasan, and so on.

Section III. *Of the fundament of the Solar year.*

The solar year is called also the year of the *Boroody* (the 12 constellations of the zodiacus) the Roman and Coptic year. The way of finding it is the following. You throw away the hundred and the exceeding year. مائي و كسوري The rest, whatever it may be,

multiply with eleven, the result of the multiplication is called *Mahssool* (product); the rest multiply with seven, throw away 30, divide what remains with 60, subtract the quotient from the Mahssool, the remainder is the fundament of fundaments.

أُس أُلا سوس This is the fundament of the Solar, Roman, and Coptic year. Another way to find out this fundament is the following. You must multiply (after having thrown away from the year of the Hedjrat the hundred ماءة and the odd number) the remainder with 10. This is also called *Mahssool.* The remaining 50 you multiply with 3, the result of this question you add to 30, divide the whole, whatever it may be, with 60, add the quotient to the *Mahssool,* and you have then the *fundament of fundaments*; if this number exceeds the number of the solar year, this must be subtracted, and the remainder is the fundament of fundaments. For example, if of the year 961 you wish to find the fundament of the Solar, Roman, and Coptic year, you throw away the hundred and odd number so that 60 remains; multiply with 11, the product is 660, multiplying this with 7, you obtain 420, throw away 30, and divide the remaining 390 with 60, the quotient 6½ is reckoned as seven; because the half and what is beyond is reckoned as one, and what is below the half is not reckoned at all; subtract this seven from the Mahssool, the remainder is 653. Subtracting from this sum the solar year you obtain 288, which is the fundament of fundaments. The second method is as follows;—of the year 961 you throw away the hundred and unity, multiply the remaining 60 with 70, this gives the *Mahssool* 600; multiply this with 53 you obtain 3180, add to it 30 it makes 3210, which sum divided by 60 gives the quotient 53, adding this to the *Mahssool* you get 653, of which subtracting the solar year you have 288, the fundament of fundaments.

Section IV. *Of the method to know the Solar, that is to say Zodiacal, year.*

The beginning of it is the entry of the sun into *Aries,* which is called *Nawroozi Sultauni,* that is the *Sultanic new year.* Be it known to you that the first day of Nawrooz is the same day (of the week) which follows the next Nawrooz; for example, if the Nawrooz falls on Saturday, it will fall the next time on Sunday, and in intercalar years one day more, on Monday. Be it also known to you that the *Nawrooz Sultauni* and the intercalar year are not the

same on all points of the globe; in some years the year will be an intercalar one for places of great longitude, but not for places of lesser longitude, in which the intercalar year is only to come on in the following year; this is evident to all persons of sound understanding. But to go on with the subject, if you add to the fundament of fundaments the sum of 172 you obtain the fundament of the constellations of the zodiacus; if this sum be greater then the number of the solar year you subtract it, and the remainder is the fundament. For this operation there is no regard for the intercalar year; you subtract the fundament of the constellations from the broken lunar year, and if this cannot be, you subtract it from the solar year, add what remains to the broken lunar year, subtract from the whole the solar year, and obtain by this operation in the remainder the number of the days of the zodiacal year; you assign to each of the twelve constellations its number of days, and the sun shall be in the degree of the constellation in which your calculation ends, the number of the degrees are

Aries,	*Taurus,*	*Gemini,*	*Cancer,*	*Leo,*	*Virgo,*
31	31	31	32	31	31
Libra,	*Scorpio,*	*Sagittarius,*	*Capricornus,*	*Aquarius,*	*Pices,*
30	30	29	29	30	30.

For example, if you wish to know in which degree the sun is to be found in the year 961, you proceed in the following way. We know by what has been said that the fundament of fundaments in this year is 288; add to it 172 it makes 460, subtract from it the number of the solar year, 365 days, there remain 95, which you subtract from the broken lunar year if you can; as it is impossible in this year to throw away the first of Ramazan, you make the subtraction so that one month is perfect and the other deficient, and counting also the first of Ramazan you obtain 237; from this you subtract the above-mentioned 95, there will remain 142; of this sum you assign 31 degrees to *Aries*, 31 to *Taurus*, 31 to *Gemini*, 32 to *Cancer*, and the remaining 17 to *Leo*, so that the sun is to be found in the seventeenth degree of Leo; the constellation of Cancer has in our days 32 degrees, although ابو نصر فراهي Aboo Nassr Ferahi mentions in the نصاب *Nessab* the following distinction:

XXXI and XXXI, XXXI, XXXII, XXXI, XXXI, are six months
XXX, XXX, XXIX and XXIX, XXX, XXX, are the short months
لا ولا لا لب را ولا لا شش ماه ست لل كط و كط لل شهور كونه است
But this agrees with the time when the sun in its greatest height is in *Gemini*, now the sun being in its greatest height in *Cancer*, this has

32 degrees, which will change in future time so that the constellation wherein the sun is in its greatest height is always to be of 32 degrees; be it known also that in the first climate summer falls in the signs of *Aries, Taurus, Gemini;* autumn in those of *Cancer, Leo, Virgo;* winter in those of *Libra, Scorpio, Sagittarius;* spring in *Capricornus, Aquarius,* and *Pisces;* in these parts, that is in the northern ones, it is the contrary. If you wish to know in which of the 28 lunar stations the sun rises, you proceed as follows;—add to the number of degrees in which the sun is found that day, the number 8; give to each station 13, except *Spica* to which you give 14, and if the year be an intercalar one you give also 14 to *Resha* (β in the Andromeda); the beginning of numbering is in our times *el Awwa* ($\beta,\gamma,\iota,\delta\varepsilon$ in Virgo) because the beginning of *Awwa* falls in the 22nd degree of *Spica*, and the end of it in the beginning of Libra, that is to say the beginning of it retards eight degrees.

But the stations of the moon proceed with the eighth sky in 70 years one degree, according to which you must operate. Where the number beginning from *el Awwa* $\beta,\gamma,\iota,\delta\varepsilon$ in Virgo terminates at sunset, غروب شمسذ there the station of the moon is rising; for example—if you wish to know which station of the moon is rising at sunset on the first of Ramazan in the year 961, you find the sun in the seventeenth degree on the 142nd day of the year of constellations. Add to it the number 8, you get 150; begin then from *el-Awwa*, the 13th station, counting for each station 13, but to *Spica* 14; six days to the 24th station β and ξ in Aquarius; six days having elapsed since the rise of this station, called *Saadessofood,* so that there remain nearly seven days. Be it known also that the beginning of *el-Awwa* at the end of the 23rd degree of Spica, and its retard of eight degrees from the beginning of Libra, happened in the year of the Alexandrine era 1749, that is to say in the time when the tables of Ulagbigh were made. This book has been composed in the 1865th year of the era of Alexander (the Sileucian) 1553 S. E. so that 116 years have elapsed between. In this case each station has moved nearly two degrees in our time, and it is therefore necessary to add to the number of the solar degrees the number *six;* seventy years hence when the stations shall have proceeded one degree more, the number *five* must be added and so on till the beginning of the 13th station (*el-Awwa*) shall come to the beginning of Libra, in which time no number shall be added; when afterwards the end of *Isarfa* (the 12th station) shall come to the beginning of Libra the number 12 must be added, and you

will begin then to count from the beginning of *Isarfa*, and in the same way you proceed through the other stations.

SECTION V. *Of the (Romi) Roman year.*

It begins with the first day of *Teshreen ewd;* be it known that the day of the week with which it begins precedes the day of the week with which the following year is beginning; for example, if the first day of the year be Sunday, the first day of the next year will be Monday. The fourth part of a day, (which is exceeding every year) gives in four years the intercalar day. In this year the day of the week of the next year is two days later, on Tuesday. It is also to be observed that even in the Roman year the seasons must change in the course of time, which the greatest part of men are unaware of: so in the course of time the months of spring must become those of Autumn: because according to the tables of *Ooloozbey*, there are wanting to the fourth part of the day forming the intercalar, one 28 to the second, and 40 to the third. But as in the Roman years a fourth part is counted, the above said deficiency makes in 123½ years one day to be added, the cause of it is that the fourth part of a day counted each year is not exactly a fourth, but deficient; which implies the necessity of adding one day more to the above mentioned space of years. For example, the *Nawroozi Sultauni* falling now on the 11th Adas, that is to say March, shall fall after the above mentioned time on the 10th, then on the 9th, and make the four for some calendarian works. The day of *Nawroozi Sultauni* is found mentioned on the 13th of Adas. This book has been translated in the year 1865 of the Sileucian era; the difference since the establishment of that era makes 14 days at the time of its introduction, the beginning of spring; that is, the entrance of the sun in Aries was on the 26th of March; but as a long time has elapsed since people are in general not aware of this era, *Nasicreddin Toosi* (the great astronomer) calls in his treaty celebrated by its name *Si* (Thirty) the Roman year the *veritable* one, but it is not so, حقيقي the *veritable* one is the year of constellations commonly called the *Djelatian* year. It is a curious fact that the great astronomers *Mirza Ooloozbey*, *Mir Ghaiaseddin*, *Djemsheed*, *Hazizade Koomi* and *Molla Ali Kooshdji* (on whom be God's mercy!) call in the new Ephemerides the Greek year the solar one, which is a negligence. On the 7th February the first kindling spark جمرة of spring is falling; on the 4th the second spark; on the 21st the third, after which the cold of winter is broken; on the 26th is the cold day of

the old woman ; on the 18th Agar the beginning of warm winds ; on the 19th July the first canicular day, after which the heat is broken. This is the way in which our astronomers fix their days, but with no reason, because they ought to fix them according to the seasons, and not according to the Roman year, which is not stable.

The way of knowing the Roman year is to add to the fundament of fundaments 10, the sum gives the fundament of the Roman year, subtract it from the broken lunar year, the remainder gives the days of the Roman year, the names of the *(Roomic)* year are with the number of days as follows,

Teshreen I. 31. Teshreen, I. 30. Kanoon I. 31. Kanoon II. 30 and Shooba I. 28. Arer 31. Nisan 30. Ayar 31. Haziran 30. Temooz 31. Ab 31. Eilool 30.

If you wish to know on which day of the Greek year falls the first of Ramazan, add to the fundament of fundaments 288 the number 16, it gives 298, subtract it from the broken lunar year, which not being possible as the number is 237, you must add the number of the solar year, which makes 602, from which you subtract the fundament of the Roman (Greek) year ; the remainder is 304, which you distribute according to the months, and you will find the day to be the last of August. For the Roman (Greek) year the birthday of Jesus, the days of *Khizr* (St. George's) and *Kasim* (St. Demitrius') fall for ever on the same day, but not so the Lent and Easter ; the Lent falls in the simple years between the 2nd of February and 8th of March, and begins from the Monday nearest ; the number of its days is 48, the 49th Sunday being Easter Sunday ; if Lent begins on the 8th of March, Easter falls on the 25th of April, that is to say two days later than *Khidhi Elias* (St. George's) ; if the Lent begins on the 2nd of February, and intercalar years on the 3rd of February ; Easter falls on the 22nd March, 32 days before *Khidhi Elias :* the greatest distance between the two being 35 days.

Section VI. *Of the Coptic year.*

Add to the fundament of fundaments 342, the sum is the fundament of the Coptic year ; subtract it from the broken lunar year, and the rest will give the days of the Coptic year, the months of which are, *Thom* 30, *Poazhi* 30, *Hathor* 30, *Kihall* (Khiak) 30, *Tybi* 30, *Emsheer* (Makhir) 30, *Bermohat* (Thamenoth) 30, *Birmoode* (Tharmatic) 30, *Tasheesh* (Takhon) 30, *Tayni* 30, *Epiphi* 30, *Mesori* 30. If, for example, you wish to know on which day of the Coptic year falls the first of Ramazan of the year 961, add to the

fundament of fundaments of this year, which is 288, the number 342, subtract the sum 830 from the lunar broken year, which not being possible, you must add to it the solar year; the remaining 285 is the fundament of the Coptic year; subtract it if possible from the lunar year, and if it be not possible add to it the solar year; the number of the broken solar year is 237, the sum gives 802; subtract from it the Coptic fundament 165; the remaining 337 distribute amongst the above said months, giving to each 30 days, you will find the first Ramazan to fall on the 7th of *Mesori*.

Section VII. *Of the Persian year.*

The beginning of it is the *Yazdjerdian Nawrooz*; be it known that this *Nawrooz* falls regularly in the next year on the day of the week next to that with which it begun in the former, so if it begins this year with Monday it begins next with Tuesday, because there is no intercalar year in the Yazdjerdian cyclus. The way, of knowing it, is to throw away the hundred and odd number of the year of the Hedjra, and to multiply the rest with 11. Keep what you obtain and multiply it again with 11: add to one of these two products 53, and call this sum *Madjmoo*, divide the second with 30, subtract the quotient *Madjmoo*, from the number which remains beside; if the quotient is less than 19, you do not mind it, if it is greater than 19 you add it to the quotient, subtract the rest of the *Madjmoo* from the broken lunar year, and if this is not possible add to it the solar year; from the sum subtract the *Madjmoo*, the remaining number gives the day of the *Nawrooz*. For example—if you wish to know on which day of the Yesdedjerdran year falls the first of Ramazan of the year 961, you throw away the hundred and the odd number of the years of the Hedjra, multiply the remaining 80 with 11, which gives 660, add to the first 660 the number 93 which makes 713, and call this *Madjmoo*, divide the second 660 with 30, the quotient of which is 22; subtract this from the *Madjmoo*, and you will obtain 891; subtract of this the solar year and you will get 326. As it is impossible to subtract this sum from the broken lunar year you must add to this the solar, which makes 602, from which you subtract 326, the remaining 276 are the days of the Yesdedjerdran year, which you distribute according to the months *Farwardeen* 30, *Ardebehesht* 30, *Khorded* 30, *Tir* 30, *Mordad* 30, *Shahirwer* 30, *Mihs*, 30 *Aben*, 30, *Azes*, 30, *Dei* 30, *Rahman* 30, *Isfendarmed* 30; and you will find the first Ramazan to fall on the tenth of *Dei*.

ART. V.—*Description of an Astronomical Instrument presented by* RAJA RAM SING, *of Khota, to the Government of India.*—*By* J. J. MIDDLETON, ESQ. *of the Hindoo College, Calcutta.*

The instrument of which I am about to attempt a description, was presented some time ago by the Raja of Khota to the Government of India, as a very good specimen of its kind. The body of the instrument consists of a square plate of pure and massive silver, in addition to which, on one side, is a plummet or index-rod, which revolves freely in the vertical upon an axis fixed at one of the angles of the plate, and at the termination of a tube of about one-sixth of an inch in diameter, which runs the whole length of one side of the instrument. On the other side an index, consisting of four hands, at right angles to each other, and of nearly the radius of the plate, is screwed on to the centre of the plate, around which it revolves at pleasure. The drawings which accompany this description will render the above observations quite clear.

The Sanscrit inscription on the obverse of the plate, and occupying a triangular space at one of its angles, informs us at once of the class of instruments to which it belongs. The inscription may be rendered as follows—"In the year 1891 Sumbut, (1756) "Shokabdha, in the "month of Assar, on the 7th day of the moon, the son of Boidhanath, "constructed this astronomical instrument, in accordance with the "principles of an astronomical work, styled *Jontro Chintamony*, "under the direction of Raja Ram Sing of Khota, (blessings be upon "his head) who is an encourager of learned men."

We learn from this, that the instrument is of very modern construction, a circumstance which however in no way detracts from its substantial interest, since it is not indebted, so far as I can discover, to modern principles of science, but might have been fabricated or used by the Indian astronomer of some thousand years ago. This, and the great rarity of astronomical instruments in India, at least in this part of it, contribute to it considerable importance. Of several learned Brahmins with whom I have consulted regarding the instrument, no one could give any account of it; indeed, with the exception of some unimportant facts, it was to them only a subject of astonishment; some, it is true, had read of such instruments in Bhascara, and other commentators on the Siddhants, but their notions of them, thus derived, were in the highest degree obscure. No additional fact is necessary to prove how rapidly Indian

astronomy is fading away in its native soil,—a decay which the Brahmins themselves readily admit; and which they attribute to the little encouragement held out to those who profess it. Although the relaxation of the grasp in which the Brahmins have long held the Indian mind, can be no subject of regret, and the discredit of their vaticinations no ground for lament; yet those who delight to trace the history of the human mind, and who contemplate with satisfaction the monuments of its industry and power, must ardently desire that Indian astronomy should be embalmed, as entire and perfect as possible, in scientific history. To effect this, the lover of science should allow no fact to escape him, being assured, that so soon as the sciences of the West have been diffused over India, so soon will Indian astronomy be but a name.

I shall begin my particular description of the instrument by showing its use in finding the time of the civil, or *bhúmi sávan*, day, which with the Indian extends from sunrise till sunset. For this purpose the inner quadrantal arc, described upon the obverse of the instrument, is graduated from right to left to fifteen prime divisions, these again being subdivided into six equal parts; the former being the number of *dundas* in half the Indian equinoctial day, and the latter being arcs of ten *pulahs* each, equal to four of our minutes. This will be rendered more plain by the following table of Indian divisions of time.

6 Respirations	=	1 Vicala.
60 Vicala	=	1 Dunda.
60 Dundas	=	1 Nachshatral day*

In order to find the time of the day, the observer places the index rod upon its axis, which is fixed near one extremity of the tube, and raises the instrument in the vertical plane till he can see the sun through the tube; he now marks what part of the circle of time just described is cut by the rod, and reads off the number of hours and minutes, proximately, which the sun has of altitude, and this being added to the time of sunrise, or subtracted from that of sunset, (data which their almanacks supply) gives him the hour of the day. I need scarcely mention, that though the result is not strictly true even within the tropics, yet it is sufficiently so for the Indian astronomer, who diminishes its errors by compensations, a mode of correction to which he is accustomed, and in the application of which he is exceedingly skilful. The outer circle is an arc of the meridian intercepted between the equator and the pole, and is graduated to 90°, the divisions being num-

* Nachshatral day, the time of an entire revolution of the earth.

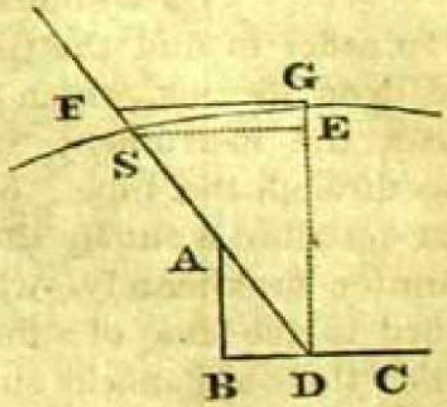
bered from left to right. By this, the index-rod being adjusted as in the last case, the zenith distance may be readily found; but when taken in connexion with other parts of the instrument, the latitude of places is also easily found. Before describing the manner in which this is done, however, it may be as well to enter into a brief exposition of the principles involved.

Of all the observations which the Indian astronomer makes, none are so generally important to him as those made with his gnomon and graduated horizontal plane, for any error committed here vitiates almost every calculation to which he is accustomed. When the practical imperfection of this instrument is considered, and the difficulty which the Indian artist has to encounter in its construction and adjustment from the rude tools he uses, it is a matter of much astonishment that he attains such accuracy as he will be presently seen to do.

Having fixed a conical gnomon perpendicularly upon a plane, which he graduates into *ungolas*, or digits, each equal to a twelfth part of the height of the gnomon, he again subdivides these into *beungols* or 60ths of an ungol. Thus provided, he proceeds at noon on the day of the equinox, to measure the length of the sun's shadow—an operation upon the accuracy of which depends his reputation as an astronomer. Having carefully ascertained the length of the shadow, he next proceeds to the determination of his latitude, which he effects in the following manner :—

Let A B be the gnomon, B C the graduated plane upon which the shadow is to be measured, S A D a ray from the sun S, then B D is the shadow.

Draw D G at right angles to B D, and upon it let fall the perpendicular S E, and from G draw G F perpendicular to D G.



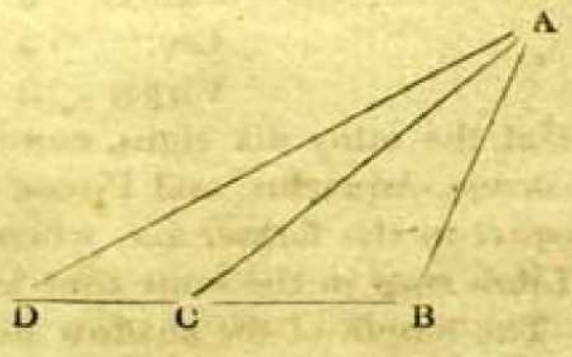
Then $\sqrt{A B^2 + B D^2} = A D$ by the 47th of Euclid (a proposition well known to Indian mathematicians, and probably borrowed from them) and $\frac{B D}{A D} = \frac{S E}{D S}$ = the sine of the zenith distance.

Indian mathematicians do not appear to have been acquainted with the nature and use of tangents; had they been so, they would cer-

tainly have used them in the present case, as their object would thereby have been less indirectly attained; since $\frac{B\,D}{A\,B} = \frac{G\,F}{D\,G}$ = tan. zen. dist.

These observations being premised, let us again return to the examination of the plate. It will be observed that its surface within the circles is crossed by equidistant straight lines, intersecting each other at right angles, and that at the twelfth division counting from the angle where the axis of the index-rod is placed along on the one side, the perpendicular has the points of intersection of the other lines numbered 1, 2, 3, 4, &c. If then the outer line thus intercepted by the line last mentioned be taken to represent the axis of the gnomon, the lines 1, 2, 3, 4, will represent the section of its shadow, and if the edge of the rod, adjusted as before, be brought over the number signifying the length of the shadow, that edge will also intercept a segment of the quadrant of latitude equal to the zenith distance. This will readily appear on inspection of the diagram just given. Thus the length of the shadow at any place being known, our instrument at once reveals the latitude.

The only use of this side of the instrument, so far as I can make out, which remains to be explained, is in the determination of heights and distances. To show its usefulness in this respect, little more will be necessary than to adduce an example of its application; let A B be an inaccessible object standing on the horizontal plane B D, whose height is required.



Observe through the tube the summit A, and mark what division of the line 1, 2, 3, the index allowed to revolve freely on its axis intersects, and let that be, for example, at the number 12; then go backwards in a direct line from the object to any new station D and observe the summit of the object as before; let us suppose that now the edge of the rod is found to intersect at the number 16, then we have 16-12 : 16 : DC : D B=4CD

and 16 : 4CD : 12 : BA=3CD, the height required.

It is unnecessary to multiply examples, as from the one now given the readiness with which trigonometrical measurements of a simple kind may be effected without the introduction of angular functions, is sufficiently evident. As to the accuracy with which they can be performed, it may be perhaps sufficient to state that, after a little practice, I found

myself able to determine heights and distances with it with very great exactness.

Let us now turn our attention to the reverse side, where, by removing the revolving indices, we meet with numerous letters arranged around the centre in concentric zones, being an arrangement called *lotas*, the Indian metaphor of beauty, and a form peculiarly favoured of Indian sages.

The numbers 1, 2, 3, 4, it will be observed, are written exterior to the outer circle, and indicate the beginning of the four slokes which make up the figure; the three first being read across, and constituting diameters to the outer circle, the fourth forming the outer circle itself. The following is a translation.

'The length of the shadow of the gnomon at Khota is five ungols 'and 30 beaugols, in consequence of which the elevation of the signs 'above the horizon takes place there in times the particulars of which 'are as follow—

Aries,	3	Dundas,	43	Pulas.
Taurus,	4	,,	15	,,
Gemini,	5	,,	5	,,
Cancer,	5	,,	41	,,
Leo,	5	,,	43	,,
Virgo,	5	,,	33	,,

'But the other six signs, namely Libra, Scorpio, Sagittarius, Capri-'cornus, Aquarius, and Pisces, are in point of rising above the horizon 'equal to the former six, when taken in inverse order; that is to say, 'Libra rises in the same time as Virgo, and so on.'

The length of the shadow here given is not quite correct,* at least if I may credit, which I have good reason to do, the result of Mr. Hunter's computations, published in the fourth volume of the Asiatic Researches. According to that careful observer, the latitude of Khota is 25° 11′ 41″, while the datum of the instrument gives but 24° 37′ 25″, which, notwithstanding some corrections which I shall presently make, still leaves the latter in defect.

The difference between the latitude of Khota, as calculated by Mr. Hunter, and that deduced from the Indian datum is, 34′ 16″; this is considerable, and is perhaps not entirely attributable to imperfection of instruments or carelessness of observation, but to the

* The same length of shadow 5 a 30 b is the same as that supposed in the Bhagulpore tables given by Le Gentil. In both cases the number is suspiciously round, and in both also somewhat inaccurate.

omission of certain elements which the European astronomer takes into account. But little familiarity with astronomy is necessary to an apprehension of the fact that, whatever apparently elevates the sun above his true position must, in the same ratio, diminish the shadow of the gnomon, and consequently the latitude thence deduced. Now refraction does this to a small extent, and the rays of light from the sun's upper limb cause a much greater error of the same kind.

Making the necessary corrections, we have

Difference, ...	— 34′	16″
Refraction, ...	.. +	26″
Sun's semidiameter, ..	.. +16′	4″
True difference, ..	— 17′	46″

This is, as I doubt not will be generally allowed, a difference astonishingly small, considering the imperfection of the instrument employed in observation.

Before entering on the examination of the Table of Ascensions of the Signs as given above, it may be as well to inform the reader that after having ascertained the occurrence of any celestial phenomenon, such as an eclipse for instance, in sideral time, the astronomer next converts this into civil time ; to do which it is necessary that he should know how long each sign occupies in rising. This he effects in the following manner :—

Let us take for example the sign Aries, the place Khota, the length of the equinoxial shadow, as it is given to us, 5 ungols and 30 beungols, and the obliquity of the ecliptic 24°

1 : Sin 24 :: Sin 30 : Sin decl.

9·6093133
9·6989700

9·3082833

12 : 5·5 :: Sin decl. : Chitija

8·9207188
0·7603627
9·7082833

8·9693648

Cos. decl. : 1 : : Chitija : Sin chara
0·0091609
8·9693648

8·9785257= 5° 28′ nearly,—ascensional diff.

Again, the Lugna of Lanca, or right ascension, is,

+ 17° 50′
Chara — 5° 28′

Gives 22°.22′ the ascension of the sign Aries at Khota, which being reduced to Dundas gives us $\frac{22.366}{6}$ = 3,726=3 dundas 43 pulas nearly, as given on the plate, notwithstanding that my calculations have been performed with logarithms; a sufficient proof, if proof were needed, that where care can save him from error the Indian astronomer is not wanting. It will be seen that I have assumed the obliquity of the ecliptic to have been estimated at 24°, which assumption gives me the true result; this supports the statement made in the beginning of this article, that the instrument is not beholden to modern science for the principles of its construction. Calculating by spherical trigonometry, and assuming the same obliquity, I obtain 3 dundas and 40 pulas for the ascensional arc, giving a difference in time of 3 pulas, or about one of our minutes; an error so small, that even were the Indian astronomer aware of its existence he would disregard it, satisfied that the practical purposes which his labours subserve, are, notwithstanding, carried out with sufficient accuracy.

The zones which bound this side of the instrument alone remain to be explained. There are two of them, with their subordinate circles, the inner serving for an hour circle, the outer for the *Bhagana* or zodiac. It will be observed that in the latter the signs are arranged in pairs, and are referred to the hour circle, of which they occupy segments proportioned to their times of ascension, as given above, while the pairs whose ascensional arcs are equal, are classed together: viz. Mesha and Minah, (Aries and Pisces) Brisha and Khumbo (Taurus and Aquarius) and so on. The whole zodiac thus occupies an equatorial arc of 12 hours, or 30 dundas.

Indian astronomers divide their zodiac in the same manner as those of Europe, and have equivalent names for their signs, as appears in the following table.

Divisions of the Zodiac.

60 Vicalas	=	1 Cala	30 Bhagas	=	1 Rasi
60 Calas	=	1 Bhaga	12 Rasis	=	1 Bhagana.

Names and order of the Signs.

Mesha	The Ram	Toulah	The Balance
Brisha	The Bull	Brishika	The Scorpion
Mithouna ..	The Twins	Dhanou	The Archer
Corcota	The Crab	Mocora	The Sea-monster
Singha	The Lion	Coumbho ..	The Pitcher
Cunya	The Virgin	Meena	The Fishes

This is a remarkable fact, and in itself a strong argument against the opinion entertained by some, that the boasted antiquity of Indian astronomy owes its rise to imposture practised by the Brahmins; since it is inconceivable that men capable of perfecting so astonishing a system would have permitted a coincidence so striking, and so encouraging to envy or suspicion, to continue.

The revolving indices, although they might serve the astronomer to illustrate the revolution of the colures, were more probably intended to assist the astrologer in the partition of the celestial concave—an early and important process in the investigation of destiny.

I must not quit this subject without expressing my grateful acknowledgments to Bishonath Turkabhooshuna and Jogodhan Missi, two learned Pundits of this city, for their valuable assistance in translation of the inscriptions.

ART. VI.—*Extract from a Memoir on the Preparations of the Indian Hemp, or Gunjah,* (Cannabis Indica) *their effects on the Animal system in Health, and their utility in the Treatment of Tetanus and other Convulsive Diseases.*—*By.* W. B. O'SHAUGHNESSY, M. D. *Professor in the Medical College of Calcutta, &c. &c.*

(Continued from page 745.)

SECTION V.

Experiments by the author—inferences as to the action of the drug on animals and man.

Such was the amount of preliminary information before me, by which I was guided in my subsequent attempts to gain more accurate knowledge of the action, powers, and possible medicinal applications of this extraordinary agent.

There was sufficient to show that Hemp possessed in small doses an extraordinary power of stimulating the digestive organs, exciting the cerebral system, of acting also on the generative apparatus. Larger doses, again, were shewn by the historical statements to induce insensibility, or to act as a powerful sedative. The influence of the drug in allaying pain was equally manifest in all the memoirs referred to. As to the evil sequelæ so unanimously dwelt on by all writers, these did not appear to me so numerous, so immediate, or so formidable, as many which may be clearly traced to over-indulgence in other powerful stimulants or narcotics, viz. alcohol, opium, or tobacco.

The dose in which the Hemp preparations might be administered, constituted of course one of the first objects of inquiry. Ibn Beitar had mentioned a *direm*, or 48 grains of *Churrus*, but this dose seemed to me so enormous, that I deemed it expedient to proceed with much smaller quantities. How fortunate was this caution, the sequel will sufficiently denote.

An extensive series of experiments on animals, was in the first place undertaken, among which the following may be cited :

Expt. 1.—Ten grains of Nipalese *Churrus*, dissolved in spirit, were given to a middling sized dog. In half an hour he became stupid and sleepy, dozing at intervals, starting up, wagging his tail as if extremely contented, he ate some food greedily, on being called to he staggered to and fro, and his face assumed a look of utter and helpless drunkenness. These symptoms lasted about two hours, and then gradually passed away ; in six hours he was perfectly well and lively.

Expt. 2.—One drachm of *Majoom* was given to a small sized dog, he ate it with great delight, and in twenty minutes was ridiculously drunk ; in four hours his symptoms passed away, also without harm.

Expts. 3, 4, & 5.—Three kids had ten grains each of the alcoholic extract of *Gunjah*. In one no effect was produced ; in the second there was much heaviness, and some inability to move ; in the third a marked alteration of countenance was conspicuous, but no further effect.

Expt. 6.—Twenty grains were given, dissolved in a little spirit, to a dog of very small size. In a quarter of an hour he was intoxicated ; in half an hour he had great difficulty of movement ; in an hour he had lost all power over the hinder extremities, which were rather stiff, but flexible ; sensibility did not seem to be impaired, and the circulation was natural. He readily acknowledged calls by an attempt to rise up. In four hours he was quite well.

In none of these or several other experiments was there the least indication of pain, or any degree of convulsive movement observed.

It seems needless to dwell on the details of each experiment; suffice it to say, that they led to one remarkable result—That while carnivorous animals and fish, dogs, cats, swine, vultures, crows, and adjutants, invariably and speedily exhibited the intoxicating influence of the drug, the graminivorous, such as the horse, deer, monkey, goat, sheep, and cow, experienced but trivial effects from any dose I administered.

Encouraged by these results, no hesitation could be felt as to the perfect safety of giving the resin of Hemp an extensive trial in the cases in which its apparent powers promised the greatest degree of utility.

Cases of Rheumatism treated by Hemp.

The first cases selected were two of acute rheumatism, and one of that disease in the chronic form. In the two former but little relief had been derived from a fair trial of antiphlogistic measures, and Dover's powder with antimonials—In the last case, sarsaparilla at first, and subsequently the Hemidesmus Indicus with warm baths had been tried without advantage.

On the 6th November, 1838, one grain of the resin of Hemp was administered in solution, at 2 P. M. to each of these three patients.

At 4 P. M. it was reported that one was becoming very talkative, was singing songs, calling loudly for an extra supply of food, and declaring himself in perfect health. The other two patients remained unaffected.

At 6 P. M. I received a report to the same effect, but stating that the first patient was now falling asleep.

At 8 P. M. I was alarmed by an emergent note from Nobinchunder Mitter, the clinical clerk on duty, desiring my immediate attendance at the Hospital, as the patient's symptoms were very peculiar and formidable. I went to the Hospital without delay, and found him lying on his cot quite insensible, but breathing with perfect regularity, his pulse and skin natural, and the pupils freely contractile on the approach of light.

Alarmed and pained beyond description at such a state of things, I hurried to the other patients—found one asleep, the third awake, intelligent, and free from any symptoms of intoxication or alarm.

Returning then to the first, an emetic was directed to be prepared, and while waiting for it I chanced to lift up the patient's arm. The professional reader will judge of my astonishment, when I found that it remained in the posture in which I placed it. It

required but a very brief examination of the limbs to find that the patient had by the influence of this narcotic been thrown into that strange and most extraordinary of all nervous conditions, into that state which so few have seen, and the existence of which so many still discredit—the genuine *catalepsy* of the nosologist.*

It had been my good fortune years before to have witnessed two unequivocal cases of this disorder. One occurred in the female clinical ward in Edinburgh, under Dr. Duncan's treatment, and was reported by myself for the Lancet in 1828. The second took place in 1831, in a family with whom I resided in London. The case was witnessed by Dr. Silver, Mr. G. Mills, and several other professional friends. In both these cases the cataleptic state was established in full perfection, and in both the paroxysm ran on each occasion a regular course, and terminated suddenly without any evil consequence.

To return to our patient, we raised him to a sitting posture, and placed his arms and limbs in every imaginable attitude. A waxen figure could not be more pliant or more stationary in each position, no matter how contrary to the natural influence of gravity on the part.

To all impressions he was meanwhile almost insensible; he made no sign of understanding questions; could not be aroused. A sinapism to the episgastrium caused no sign of pain. The pharynx and its coadjutor muscles acted freely in the deglutition of the stimulant remedies which I thought it advisable to administer, although the manifest cataleptic state had freed me altogether of the anxiety under which I before laboured.

The second patient had meanwhile been roused by the noise in the ward, and seemed vastly amused at the strange aspect of the statuelike attitudes in which the first patient had been placed, when on a sudden he uttered a loud peal of laughter, and exclaimed that four spirits were springing with his bed into the air. In vain we attempted to pacify him; his laughter became momentarily more and more incontrolable. We now observed that the limbs were rather rigid, and in a few minutes more his arms or legs could be bent, and would remain in any desired position. A strong stimulant drink was immediately given, and a sinapism applied. Of the latter he made no complaint, but his intoxication led him to such noisy exclamations, that we had to remove him to a separate room; here he soon became tranquil, his limbs

* The subject of the celebrated Article in Blackwood, the "Thunder-struck" of the Diary of a late Physician.

in less than an hour gained their natural condition, and in two hours he experienced himself perfectly well and excessively hungry.

The first patient continued cataleptic till 1 A. M., when consciousness and voluntary motion quickly returned, and by 2 A. M. he was exactly in the same state as the second patient.

The third man experienced no effect whatever, and on further inquiry, it was found that he was habituated to the use of *Gunjah* in the pipe.

On the following day it gave me much pleasure to find that both the individuals above mentioned were not only uninjured by the narcotic, but much relieved of their rheumatism; they were discharged quite cured in three days after.

The fourth case of trial was an old muscular cooly, a rheumatic malingerer, and to him half a grain of Hemp resin was given in a little spirit. The first day's report will suffice for all.—In two hours the old gentleman became talkative and musical, told several stories, and sang songs to a circle of highly delighted auditors, ate the dinners of two persons subscribed for him in the ward, sought also for other luxuries I can scarcely venture to allude to, and finally fell soundly asleep, and so continued till the following morning. On the noon-day visit, he expressed himself free from headache or any other unpleasant sequel, and begged hard for a repetition of the medicine, in which he was indulged for a few days, and then discharged.

In several cases of acute and chronic rheumatism admitted about this time, half-grain doses of the resin were given, with closely analogous effects;—alleviation of pain in most—remarkable increase of appetite in all—unequivocal aphrodisia, and great mental cheerfulness. In no one case did these effects proceed to delirium, or was there any tendency to quarrelling. The disposition developed was uniform in all, and in none was headache or sickness of stomach a sequel of the excitement.

Case of Hydrophobia.

A case now occurred in which the influence of a narcotic, capable either of cheering or of inducing harmless insensibility, would be fraught with blessings to the wretched patient.

On the 22nd November at 8 A. M. a note in English was handed to me by my servant, entreating my assistance for the Hakim Abdullah, then at my gate, who had been bitten by a rabid dog three weeks before, and who feared that the miserable consequences of the bite al-

ready had commenced. I found the poor man in a carriage; he was perfectly composed, though quite convinced of the desperate nature of his case. He told me that the evening before, on passing near a tank he started in alarm, and since then was unable to swallow liquid. His eye was restless, suspicious, and wild, his features anxious, his pulse 125, his skin bedewed with cold moisture; he stated nevertheless that he wished for food and felt well;—a small red and painful cicatrix existed on the left fore-arm.

He was immediately removed to the Hospital, where I accompanied him. By his own desire water was brought in a metallic vessel, which he grasped and brought near his lips;—never can I forget the indescribable horrors of the paroxysm which ensued. It abated in about three minutes, and morbid thirst still goading the unhappy man, he besought his servant to apply a moistened cloth to his lips. Intelligent and brave, he determinately awaited the contact of the cloth, and for a few seconds, though in appalling agony, permitted some drops to trickle on his tongue,—but then ensued a second struggle, which, with a due share of the callousness of my profession, I could not stand by to contemplate.

Two grains of Hemp resin in a soft pillular mass were ordered every hour; after the third dose he stated that he felt commencing intoxication—he now chatted cheerfully on his case, and displayed great intelligence and experience in the treatment of the very disease with which he was visited. He talked calmly of drinking, but said it was in vain to try—but he could suck an orange; this was brought to him, and he succeeded in swallowing the juice without any difficulty.

The Hemp was continued till the sixth dose, when he fell asleep, and had some hours rest. Early the ensuing morning, however, Mr. Siddons, my assistant, was called up to him, and found him in a state of tumultuous agony and excitement; tortured by thirst he attempted to drink,—but I will spare the reader the details of the horrors which ensued.

The Hemp was again repeated, and again by the third dose the cheering alleviation of the previous day was witnessed. He ate a piece of sugar-cane, and again swallowed the juice—he partook freely of some moistened rice, and permitted other necessary remedies to be used. His pulse was nearly natural, the skin natural in every respect. His countenance was happy. On *one* subject only was he incoherent, and even here was manifested the powerful and peculiar influence of the narcotic. He spoke in raptures of the inmates of his *zenana*, and his anxiety to be with them. We ascertained however that he had no such establishment.

Four days thus passed away, the doses of Hemp being continued. When he fell asleep on waking the paroxysms returned, but were again almost immediately assuaged as at first. Meanwhile purgative enemata were employed, and he partook freely of solid food, and once drank water without the least suffering. But about 3 P. M. of the fifth day he sunk into profound stupor, the breathing slightly stertorous.; in this state he continued, and without further struggle death terminated his sufferings at 4 A. M., on the 27th November.

Reviewing the preceding summary of this interesting case, it seems evident that at least one advantage was gained from the use of the remedy—the awful malady was stripped of its horrors;—if not less fatal than before, it was reduced to less than the scale of suffering which precedes death from most ordinary diseases. It must be remembered too that in this the first case ever so treated, I possessed no data to guide me as to the dose or manner of administration of the drug. The remarkable cases of tetanus detailed in the sequel, throw light on these important points, and will lead in future cases to the unhesitating administration of much larger quantities than at first I ventured to employ. I am not however rash enough to indulge the hope which involuntarily forces itself upon me, that we will ever from this narcotic derive an effectual remedy, for even a solitary case of this disease—but next to cure, the physician will perhaps esteem the means which enable him "to strew the path to the tomb with flowers," and to divest of its *specific* terrors the most dreadful malady to which mankind is exposed.

While the preceding case was under treatment, and exciting the utmost interest in the school, several pupils commenced experiments on themselves, to ascertain the effects of the drug. In all, the state of the pulse was noted before taking a dose, and subsequently the effects were observed by two pupils of much intelligence. The result of several trials was, that in as small doses as the quarter of a grain, the pulse was increased in fulness and frequency; the surface of the body glowed; the appetite became extraordinary; vivid ideas crowded the mind; unusual loquacity occurred; and with scarcely any exception, great aphrodisia was experienced.

In one pupil, Dinonath Dhur, a retiring lad of excellent habits, ten drops of the tincture, equal to a quarter of a grain of the resin, induced in twenty minutes the most amusing effects I ever witnessed. A shout of laughter ushered in the symptoms, and a transitory state of

cataleptic rigidity occurred for two or three minutes. Summoned to witness the effects, I found him enacting the part of a Raja giving orders to his courtiers; he could recognize none of his fellow students or acquaintances; all to his mind seemed as altered as his own condition; he spoke of many years having passed since his student's days; described his teachers and friends with a piquancy which a dramatist would envy; detailed the adventures of an imaginary series of years, his travels, his attainment of wealth and power. He entered on discussions on religious, scientific, and political topics, with astonishing eloquence, and disclosed an extent of knowledge, reading, and a ready apposite wit, which those who knew him best were altogether unprepared for. For three hours and upwards he maintained the character he at first assumed, and with a degree of ease and dignity perfectly becoming his high situation. A scene more interesting it would be difficult to imagine. It terminated nearly as rapidly as it commenced, and no headache, sickness, or other unpleasant symptom followed the innocent excess.

In the symptoms above described we are unavoidably led to trace a close resemblance to the effects produced by the reputed inspiration of the Delphic Oracles—perhaps it would not be very erroneous to conclude, that it was referable to the same kind of excitement.

Use in Cholera.

An epidemic cholera prevailing at this period, two of the students administered the tincture of Hemp in several cases of that disease, and cures were daily reported by its alleged efficacy. Dr. Goodeve was thus led to try it in several cases, and his report was in the highest degree favorable. The diarrhœa was in every instance checked, and the stimulating effects of the drug clearly manifested. The Durwan of the College, an athletic Rajpoot, was attacked, and came under my treatment after he had been ill seven hours; he was pulseless, cold, and in a state of imminent danger, the characteristic evacuations streaming from him without effort—half a grain of the Hemp resin was given, and in twenty minutes the pulse returned, the skin became warm, the purging ceased, and he fell asleep. In an hour he was cataleptic, and continued so for several hours. In the morning he was perfectly well and at his duty as usual.

It is but fair to state, however, that the character of the epidemic was not at the time malignant. I admit the cases to be inconclusive, but I conceive them to be promising, and that they deserve the due attention of the practitioner.*

Use in Tetanus.

I now proceed to notice a class of most important cases, in which the results obtained are of the character which warrants me in regarding the powers of the remedy as satisfactorily and incontrovertably established. I allude to its use in the treatment of traumatic *tetanus*, or lock-jaw, next to hydrophobia, perhaps the most intractable and agonizing of the whole catalogue of human maladies.

The first case of this disease treated by Hemp was that of Ramjan Khan, æt : 30, admitted to the College Hospital on the 13th December 1838, for a sloughing ulcer on the back of the left hand. Five days previously a native empiric had applied a red hot *gool* (the mixture of charcoal and tobacco used in the hookah) to the back of the left wrist, as a remedy for chronic dysentery and spleen. The patient's brother was similarly cauterized on the same day. In both sloughing took place down to the tendons. Symptoms of tetanus occurred on the 24th December. The brother who had refused to avail himself of European aid, had been seized with tetanus at his own home four days previously, and died after three days illness. On the 26th of December spasms set in, and recurred at intervals of a few minutes ; the muscles of the abdomen, neck, and jaws, became firmly and permanently contracted. Large doses of opium with calomel having been administered for some hours, without the least alleviation of symptoms, and his case having on consultation been pronounced completely hopeless, I obtained Dr. Egerton's permission to subject the poor man to the trial of the Hemp resin. Two grains were first given at 2½ P. M., dissolved in a little spirit. In half an hour the patient felt giddy, at 5 P. M. his eyes were closed, he felt sleepy, and expressed himself much intoxicated.

He slept at intervals during the night, but on waking had convulsive attacks.

* Since this paper was read at the Medical Society a severe epidemic cholera has broken out in Calcutta. I have treated seven cases in the Medical College Hospital, and in all the pulse and warmth returned from the use of this remedy. Five recovered, but all passed through a fever stage.—W. B. O'S.

On the 27th, two grains were given every third hour, (a purgative enema was also administered, which operated three times) the stiffness of the muscles became much less towards evening, but the spasms returned at intervals as before. Pulse and skin natural.

28th.—Improved ; is lethargic but intelligent. Spasms occasionally recur, but at much longer intervals, and in less severity.

29th.—Dose of Hemp increased to three grains every second hour. Symptoms moderating.

30th.—Much intoxicated, continues to improve.

1st January, 1839—A Hemp cataplasm applied to the ulcer, and internal use of remedy continued; towards evening was much improved; spasms trivial, no permanent rigidity, Dysentery has returned.

2nd.—*Morning report.* Has passed a good night, and seems much better. Hemp continued. *Evening report.* Doing remarkably well.

3rd, 4th, and 5th.—Continues to improve. Hemp resin in two grain doses every fifth hour.

6th.—5 P. M. Feverish, skin hot, pulse quick, all tetanic symptoms gone. Dysentery urgent.

From this day the tetanus may be considered to have ceased altogether, but the dysenteric symptoms continued, despite of the use of opium and acetate of lead; the ulcer too proved utterly intractable. Some improvement in the dysenteric symptoms occurred from the 10th to the 15th. He seemed gaining strength, but the wound was in no wise improved, the slough on the contrary threatened to spread, and two metacarpal bones lay loose in the centre of the sore; on consultation it was agreed to amputate the arm, but to this the patient peremptorily objected. The mortification now spread rapidly, and to our infinite regret he died of exhaustion on the night of the 23rd January.

An unprejudiced review of the preceding details exhibits the sedative powers of the remedy in the most favorable light; and although the patient died, it must be remembered that it was of a different disease, over which it is not presumed that the Hemp possesses the least power.

The *second case* was that of Chunoo Syce, (treated by Mr. O'Brien at the Native Hospital) in whom tetanus supervened on the 11th December, after an injury from the kick of a horse. After an ineffectual trial of turpentine and castor oil in large doses, two grain doses of Hemp resin were given on the 26th November. He consumed in all 134 grains of the resin, and left the Hospital cured on the 28th December.

Third case.—Huroo, a female, æt: 25, admitted to the Native Hospital on 16th December, had tetanus for the three previous days, the sequel of a cut on the left elbow received a fortnight before. Symptoms violent on admission. Turpentine and castor oil given repeatedly without effect; on the 16th and 17th, three grains of Hemp resin were given at bed-time. On the morning of the 18th she was found in a state of complete catalepsy, and remained so until evening, when she became sensible, and a tetanic paroxysm recurred. Hemp resumed, and continued in two grain doses every fourth hour. From this time till the third hour tetanic symptoms returned. She subsequently took a grain twice daily till the 8th of February, when she left the Hospital apparently quite well.

Mr. O'Brien has since used the Hemp resin in five cases, of which four were admitted in a perfectly hopeless state. He employed the remedy in *ten grain doses* dissolved in spirit. The effect he describes as almost immediate relaxation of the muscles and interruption of the convulsive tendency. Of Mr. O'Brien's seven cases, four have recovered.

In the Police Hospital of Calcutta, the late Dr. Bain has used the remedy in three cases of traumatic tetanus, of these one has died and two recovered.

A very remarkable case has recently occurred in the practice of my cousin, Mr. Richard O'Shaughnessy. The patient was a Jew, æt: 30, attacked with tetanus during the progress of a sloughing sore of the scrotum, the sequel of a neglected hydrocele. Three grain doses were used every second hour, with the effect of inducing intoxication and suspending the symptoms. The patient has recovered perfectly, and now enjoys excellent health.

Besides the preceding cases I have heard of two of puerperal trismus thus treated in native females. Both terminated fatally, an event, which cannot discredit the remedy, when it is remembered that the Hindoo native females of all ranks are placed during and subsequent to their confinement in a cell within which large logs of wood are kept constantly ignited. The temperature of these dens I have found to exceed 120° of Fahrenheit's scale.

The preceding facts are offered to the professional reader with unfeigned diffidence, as to the inferences I feel disposed to derive from their consideration. To me they seem unequivocally to shew, that when given boldly and in large doses, the resin of Hemp is capable of

arresting effectually the progress of this formidable disease, and in a large proportion of cases of effecting a perfect cure.

The facts are such at least as justify the hope that the virtues of the drug may be widely and severely tested in the multitudes of these appalling cases which present themselves in all Indian Hospitals.

Delirium occasioned by continued Hemp Inebriation.

Before quitting this subject, it is desirable to notice the singular form of delirium which the incautious use of the Hemp preparations often occasions, especially among young men who try it for the first time. Several such cases have presented themselves to my notice. They are as peculiar as the "delirium tremens," which succeeds the prolonged abuse of spirituous liquors, but are quite distinct from any other species of delirium with which I am acquainted.

This state is at once recognized by the strange balancing gait of the patient, a constant rubbing of the hands, perpetual giggling, and a propensity to caress and chafe the feet of all bystanders of whatever rank. The eye wears an expression of cunning and merriment which can scarcely be mistaken. In a few cases, the patients are violent; in many, highly aphrodisiac; in all that I have seen, voraciously hungry. There is no increased heat or frequency of circulation, or any appearance of inflammation or congestion, and the skin and general functions are in a natural state.

A blister to the nape of the neck, leeches to the temples, and nauseating doses of tartar emetic with saline purgatives have rapidly dispelled the symptoms in all the cases I have met with, and have restored the patient to perfect health.

The preceding cases constitute an abstract of my experience on this subject, and which has led me to the belief that in Hemp the profession has gained an anti-convulsive remedy of the greatest value. Entertaining this conviction, be it true or false, I deem it my duty to publish it without any avoidable delay, in order that the most extensive and the speediest trial may be given to the proposed remedy. I repeat what I have already stated in a previous paper—that were individual reputation my object, I would let years pass by, and hundreds of cases accumulate before publication; and in publishing I would enter into every kind of elaborate detail. But the object I have proposed to myself in these inquiries is of a very different kind. To gather together a few strong facts, to ascertain the limits which cannot

be passed without danger, and then pointing out these to the profession, to leave their body to prosecute and decide on the subject of discussion, —such seems to me the fittest mode of attempting to explore the medicinal resources which an untried Materia Medica may contain.

It may be useful to add a formula for making the preparations which I have employed.

The *resinous extract* is prepared by boiling the rich, adhesive tops of the dried *Gunjah* in spirit (Sp: gr. 835,) until all the resin is dissolved. The tincture thus obtained is evaporated to dryness in a vessel placed over a pot of boiling water. The extract softens at a gentle heat, and can be made into pills without any addition.

The *tincture* is prepared by dissolving three grains of the extract in one drachm of proof spirit.

Doses, &c.—In *Tetanus* a drachm of the tincture every half hour until the paroxysms cease, or catalepsy is induced. In *Hydrophobia* I would recommend the resin in soft pills, to the extent of ten to twenty grains, to be chewed by the patient, and repeated according to the effect. In *Cholera* ten drops of the tincture every half hour will be often found to check the vomiting and purging, and bring back warmth to the surface. My experience would lead me to prefer *small* doses of the remedy in order to excite rather than narcotise the patient.

Postscript.

While the proofs of this paper were under correction, Dr. Esdaile, of Hooghly, has communicated a case of traumatic tetanus, in which he has used the extract of Hemp and the patient recovered. The details will be subsequently published.

Mr. Sawers, the 1st Member of the Medical Board, has also favored me with the results of a very curious trial of the remedy on a pony which had been attacked by lockjaw as the sequel of forcible compression of the testes. I have the pleasure to insert an extract from Mr. Sawers' note.

"Having made no memorandum of the case of the pony, I am unable to give the particulars in detail. Before the *Bhang* was given the power of mastication had ceased for several days, and he had been supported by mixing *suttoo* (pounded pulse) and bran with his water; with this the powdered *Bhang* was mixed. When he had taken some doses the general rigidity of the muscles was in some degree removed, and he began to masticate hay and grass, and shortly was able to lie down and rise without assistance; but it was sometime ere he recovered the power of balancing the muscles so as to trot evenly.

"I direct the syce to give a little more of the *Bhang* than it was usual for a stout man to take for a *dose*, and it was given for eight or ten days, perhaps longer.

"The pony is now perfectly well. The disease was induced by compression of the spermatic chord, as a mode of castration. *Tetanus* is not so fatal in the horse as in man; of the former I have known several instances of recovery, of the latter, in all my experience I have seen but one case which did not terminate fatally.

"After the battle of Laswarry several wounded Europeans and Sepoys were received into the Hospitals at Agra with *Tetanus*, but they all died. A Sepoy who had a large wound on the outside of his right thigh (which had been brushed by a cannon ball, removing the integuments,) was seized with lock-jaw a few days after his arrival. The only medicines he took were pills of opium and calomel, which he took in large quantity, with occasional aperients;—he recovered. The disease came on gradually, and for many days his jaws were so clenched that the small pills could only be administered by an opening between two of his teeth.

"I ought to have stated that the pony had enemata daily whilst taking the *Bhang*.

Signed, "J. SAWERS."

ART. VII.—*Memorandum of Experiments on the Explosion of Gunpowder under Water by the Galvanic Battery; with a notice of the successful destruction of the wreck of the "Equitable," at Fultah Reach.*—*By* W. B. O'SHAUGHNESSY, M.D. *Assistant Surgeon, &c. &c.*

HAVING recently undertaken a series of experiments on the application of the Galvanic Battery to the explosion of gunpowder under water, with reference to the destruction of the wreck of the barque "Equitable," sunk in the channel of the Hooghly at Fultah Reach, I think it desirable to publish a succinct statement of the results to which these experiments have led.

Description of the Galvanic Battery.

The galvanic battery which I employed in my experiments is one of my own construction, but on Daniell's constant principle. It consists

of a series of rectangular copper cells, (water-tight) fifteen inches square, and the sides three-fourths of an inch apart. To one lip of the cell is soldered a small copper tube *a* (water-tight) in which a few drops of mercury are contained. One of these cells is shewn in the plate, fig. 1.

Each copper cell is provided with a sheet of zinc plate, fourteen and a half inches square, to which a thick copper wire, seven inches long, is firmly soldered. Each zinc plate is amalgamated with mercury, and enclosed in a pasteboard case, the construction of which deserves attention, as upon it depends much of the action of the battery.

Two sheets of brown pasteboard are cut, of such dimensions that they will freely slide into the copper cells. The pasteboards are then placed over each other, and their edges fastened together at three sides by thin slips of teak, half an inch wide, bound together by a few copper screws. A case or bag of this kind when well made is water-tight at the joints, but allows slow filtration to take place through its sides. One of these cases is shewn at fig. 2.

To arrange each cell the zinc sheet is introduced into the pasteboard case, and this into the copper cell.

Twelve of these cells constitute what we may term one division. The cells must not touch, and are accordingly separated by slips of wood. The zinc sheet from cell No. 1 is connected by its wire with the copper cell No. 2, the zinc of 2 with the copper of 3, and so on, as shewn in fig. 4, in which twelve are placed in a box together.

To excite the battery two different solutions are employed, one a solution of blue-stone (sulphate of copper, *nila tutiya*). This salt costs in the Calcutta bazars about twenty-two rupees per maund.

The second solution is made of sulphate of soda, (Glauber salt, *Kari nimuk*), dissolved in warm water, and allowed to cool before use.

Each copper cell is to be filled to two-thirds of its depth with the blue liquid. The pasteboard cases with their zinc sheets are to be steeped in the Glauber salt solution till thoroughly soaked, then slipped into the copper cells, and filled up with the same liquid. The battery is then ready for use.

Igniting effect produced on platinum or iron wire; how influenced by distance and thickness of conductors, and length of platinum wire.

I abstain from all explanation as to the theory or mode of action of this battery, wishing to confine myself here to its effects in the ignition of metallic wires.

To produce this effect, twist a copper bell-wire ten feet long to the wire of the last zinc plate, and connect a similar wire with the mercury tube of the first copper cell. If the free ends of these wires be joined by a fine platinum or iron wire, say two inches in length, the moment the junction is completed the platinum or iron becomes white hot, and if the battery be in full action, generally melts into numerous globules. The ready destructibility of iron by oxidation renders it inferior for the purpose now in view to platinum, which was accordingly used in all the subsequent experiments.

But if the copper wires touch each other in any part between the battery and the platinum no heating is produced, because the electrical action does not extend beyond the first metallic junction. This most important fact is made use of in a self-acting apparatus which I employ for the explosion of mines at a certain fixed time after the experimentalist has retired to a safe distance.

It also shews, that when we wish to produce ignition of platinum wire at a distance we must take some means for preventing the conductors from touching each other. But before describing how this may best be accomplished, it is necessary to examine the influence of two important circumstances over the ignition of the platinum wire, viz. the thickness of the conductors, and the distance of the platinum wire from the battery. A few experiments will render this quite intelligible.

A constant battery of twelve cells was employed, and a platinum wire two inches long and 1-30th of an inch in diameter.

1st Experiment.—Using copper bell-wire 1-12th of an inch in diameter, this battery caused the platinum wire to become so hot as to kindle saltpetre match-paper at a distance of 130 feet.

2nd Experiment.—Each conductor was formed of two strands of bell-wire. The platinum was now heated to the same degree to exactly double the distance of the first experiment.

3rd Experiment.—Three strands of wire were now employed in each conductor, twisted into a cord. The igniting distance was rather more than trebled.

My stock of wire was insufficient to carry this curious experiment further; but a trial with a weaker battery and shorter conductors as far as six strands in each, led to the inference, that the igniting distance increases in an arithmetical ratio with the *mass* of the conducting wire.

A very extraordinary circumstance presented itself in these experiments, one which has been previously observed by Davy, but the great importance of which in the present inquiry demands a distinct description.

If at the distance of 130 feet two inches of platinum wire become a bright red, we find that by shortening the wire to one inch the ignition is not increased, but diminishes remarkably. Shortened to *half* an inch *the wire ceases to be even sensibly warm to the touch!* This curious fact is one deserving all the ingenuity of the theorist to explain its nature, but my business now is with practical matters alone. It leads clearly to the employment of exploding wires of much greater length than we would employ were we ignorant of this very singular and apparently anomalous circumstance.

Insulation of conductors not essential even in water.

The preceding observations refer to *dry* conductors. It is almost needless to say that dividing the wires in any part, and thus interrupting the circuit, at once causes the platinum to return to its natural degree of coldness.

It might be, and indeed generally is supposed, that were the conductors immersed in water, this fluid would carry off the electricity, and nullify all effect on the platinum. Thence it would be inferred that it would be necessary to insulate the wires, that is, to place them within a coating of some resinous, or other non-conducting substance, which would at the same time prove impervious to water and a barrier to the passage of the electric fluid.

Impressed with the idea that this insulation might be dispensed with, I instituted several experiments with the same battery and plati-

num wire already described, using the three-strand conductors led through water in the tank of the Medical College.

The result was, that the conductors being three inches apart from each other, and prevented from mutual contact by pieces of wood, as shewn in fig. 5, the platinum wire ignited gunpowder in a bottle under water, to a distance one-third the length of that at which explosion would occur were the conductors dry.

This fact enabled me in the explosion of the barque "Equitable," hereinafter described, to dispense with the insulation of the conductors altogether, and to use naked three-strand wires, in the ladder-form, as represented in the plate.

It was manifest however that the water did interfere so much as to cut off two-thirds of the electricity in circulation from the standard battery employed. It was also found that approximating the wires towards each other to the distance of one and a half inch, produced a nearly proportionate diminution of the igniting distance. But separating the wires to the distance of three feet did not, on the other hand, materially lengthen the igniting distance. I did not attempt to trace the law by which this effect is regulated—neither time nor means were at my command to do so. But from one and a half inch to three feet constituted the limits within which, in a practical point of view, it was of the least interest to study the phenomenon.

Floating conductors, construction of.

The preceding experiments made it manifest that to effect subaqueous explosions in fresh water with perfect certainty, *naked* wires, three inches apart, might be used to the distance or *depth* of 130 feet. It next became a point of interest to learn how far the distance might be extended by floating or insulating the portion of wires not necessarily immersed in water.

Several plans for floating the wires were tried; for example, earthen pots kept at a distance by slips of bamboo were used, but found very unmanageable, the breakage of one pot frequently throwing the whole line into confusion, and sinking so many of these frail vessels as to prevent any certain results being obtained.

I then tried corks, and with complete success. One of the conduc-

tors was led through the axis of each cork, and the cork slided along; as it reached its place a brush dipped in melted pitch was applied round the wire, and the cork shoved on the pitched part. In a few seconds the pitch set, and was protected by the cork. The entire of one conductor, 480 feet in length, was thus coated, and at an expense I may observe of fifteen rupees for all the corks required.*

To the side of this corked wire the second conductor was lashed on by turns of cord. On placing the entire in the tank, I found, to my great satisfaction, that the conductors floated freely, were flexible, light, and manageable in every direction, and that with the battery all along employed, the standard platinum wire was ignited to the same distance as when the conductors were used on land.

Mode of insertion and protection of the platinum wire in the mine.

These experiments left nothing to be desired so far as the battery and conductors were concerned. The next circumstance to be attended to, was the best manner of inserting the platinum wire into the charge of powder, so as to ensure explosion without risking the entrance of water, and with such arrangements as would protect the wires from sudden strains, which might endanger their being torn asunder.

Colonel Pasley, of Chatham, was reported to have led the terminations of the wires through corks, and then to have poured on a cement composed of suet, wax, and pitch. I speak vaguely, not being in full possession of the particulars of Colonel Pasley's method. His conductors were made of wire led through ropes, well insulated by pitch, and surrounded by tarred yarn. It is said that the heavy strain of these rope-conductors frequently tore the wires from the cement, destroyed the platinum loop, and prevented the desired explosion. I do not make this statement in full knowledge of the facts,—it is moreover my most anxious wish not to misrepresent this very distinguished officer; but my object in preparing for the explosion of the "Equitable" was to guard against the evils attributed to Colonel Pasley's system, by common report and newspaper statements.

* Sola (the subaqueous spongy stems of *Æschynomen e. paludosa* of Roxburgh) was tried, but was found too brittle and weak.

My apparatus was thus prepared, see fig. 7—fifteen inches of the thick end of a gun-barrel *g*, *g*, were cut off, and a male screw turned on the barrel near its centre. To this screw was fitted a square plate of iron, half an inch thick by about five inches square *i*, *i*, having a hole at each angle to admit of fastening screws being inserted. A teak rod *t*, *t*, eighteen inches long, was now prepared so that it would just enter the gun-barrel when nearly red hot—two grooves were cut in the opposite sides of this rod, and the conducting wires let into the grooves and securely fastened in with a strip of wood and pitch cement. The rod and wires were then driven into the hot gun-barrel, and the whole immediately plunged in cold water. The contraction which ensued bound the rod and wires so firmly that no force could possibly affect the platinum loop, nor any leakage occur through the iron tube.

An inch and a half of platinum wire (*p*) was next soldered to the end of the conductors, and over these was tied a paper cartridge containing mealed Dartford powder—the cartridge was protected by a copper tube *G*, which screwed on to the end of the gun-barrel, and projected about three inches beyond the platinum loop. This tube was filled with Dartford powder and securely closed by a wooden stopper, cemented into its place by melted pitch.

The ignition of the platinum wire would explode the cartridge, and this the surrounding Dartford powder, which must burst the tube and explode the contents of the mine in which it was placed.

I may here advantageously anticipate the regular course of this narrative by stating, that the mine for the destruction of the "Equitable" consisted of a barrel-shaped wooden vessel, about seven feet long by three and a half feet in diameter, capable of containing 2,500lbs. of powder. The square iron plate *i*, *i*, fig. 7. *B*, was screwed into the side of this vessel, which was subsequently enclosed in thick sheet lead. Into the iron plate the priming tube, above described, was firmly screwed, a washer of lead being placed in the joint.

Description of self-acting apparatus for igniting the wire at any given moment.

In compliance with the wishes of Captain Fitzgerald, the engineer officer in charge of the operations for destroying the wreck, it was determined to sacrifice the battery employed, by placing it immediately

over the mine—it therefore became necessary to contrive some self-acting apparatus by means of which the requisite contact of the conductors with the battery could be made at any desired period.

Bearing in mind that all that is required to prevent the ignition of the platinum wire is to cut, or otherwise interrupt, one of the conductors—or else to bring the wires into metallic contact with each other between the battery and the platinum loop—it will be easy to understand the action of the two pieces of apparatus which I now proceed to describe.

The first of these acts by restoring contact between the ends of a divided conductor, thus completing the electric circuit and igniting the wire. But as some unforeseen accident might interfere, and render it necessary to examine the whole arrangement after the mine was laid, a contrivance was added, which after an interval of four minutes would break the circuit again and render every thing safe during examination.

This apparatus is shewn at fig. 8. It consists of a watch from which the minute hand was removed, and its place supplied by a strip of copper four inches long and a quarter of an inch broad, and fixed by its centre to the arbor of the minute hand. Each end of this index carried by a thread a wire bent thus ∩, the legs dipping into glass tubes fixed in wood, and containing a portion of mercury. As the copper index revolved, its advancing arm gradually lowered the bent wire *a a* into the tubes, and thus established contact with the battery, one of the conductors of which *c*, was interrupted at *d* and *e*. The opposite arm, also connected with a bent wire *b b*, would lift this from a similar pair of tubes after a lapse of four minutes, and thus break the contact should no explosion have occurred.

A glance at the figure in the plate will render the plan at once intelligible.

This apparatus could be set so as to go for any period from one to thirteen minutes. The watch employed cost twenty-five rupees.

The second self-acting contrivance was perhaps the simpler of the two, and depended on the fact, that if the conductors come into metallic contact with each other between the battery and the platinum wire, the electricity does not reach the latter, and no ignition occurs,—parting the conductors directs the electric fluid upon the platinum wire, and ignition accordingly ensues.

A joint of bamboo, see fig. 9 *b*, about 5 inches long by 1½ in diameter, capable of holding 2lbs. of mercury, was fitted with a small brass stopcock below, through which when opened the mercury might escape. It was found by experiment, that when fully open 2lbs. escaped through the stopcock employed in a few seconds more than five minutes.

The bamboo joint was fixed on a wooden frame *f f*, having a vessel below to receive the mercury. A stout copper wire was led through the diameter of the bamboo, one and a half inch from the bottom. A similar wire was inserted three-fourths of an inch below, and in the same direction with the first, and this second wire was divided into two parts, as shewn in the drawing. The ends of the wires were turned into a few loose spirals to allow of their being readily connected with the battery on one side, and with the conductors to the mine on the other.

Suppose this joint filled with mercury, the stopcock shut, and the battery wires connected with it at one side (say the right,) and the mine conductors connected with it at the left—in this case metallic contact being established in the conductors *c*, *c*, between the battery and the mine, no ignition can possibly occur, because the electricity returns to the battery by the first cross road it meets, if I may be permitted to use this homely, but I think expressive, illustration.

If we now open the stopcock and allow the mercury to trickle out as soon as its level subsides below that of the highest copper wire, the only path of the electric fluid now lies through the mine, the platinum becomes ignited, and explosion ensues.

But should any accident have occurred, so that no explosion takes place at once, and should therefore the whole arrangement need inspection, the mercury still subsiding passes after two or three minutes below the second wire, which having been previously cut, the circuit is now completely interrupted, and the whole arrangement is perfectly safe for inspection.

In using this apparatus two things must be attentively borne in mind. No accident can happen while it is full of mercury, but when once emptied it must not be filled again while in connexion with the battery, otherwise an explosion may ensue.

The whole arrangement is shewn in the accompanying diagram, in

which *a* represents the battery, *b* the bamboo mercury cup nearly full of mercury, *c c* the battery conductors, $\bar{c}$ $\bar{c}$ the conductors leading to the explosion tube *t*, containing the platinum wire and priming.

The whole cost of this apparatus, including quicksilver, is not more than six rupees.

It is obvious that many substitutes for the watch apparatus may be devised, and indeed the expense of even the cheapest watch procurable (ten rupees) is an objection, though an insignificant one, to its employment, where circumstances render it advisable to expend all the apparatus by placing it immediately over the mine. In a remarkable set of experiments which I witnessed, portfires were employed instead of the watch—one, six inches in length, supported by a string the wire for establishing the connexion with the battery, corresponding to the watch wires *a*, *a*—a second portfire, nine inches long, supported a weight, the descent of which was intended to break the connexion in the manner effected by the watch wires *b*, *b*. In two of the three trials in question the weight did not fall, and the consequence was the imminent danger of the destruction of the party whose duty it was to re-examine and re-adjust the arrangements on the failure of the two first attempts. In one of the trials it was observed too, that one of the tubes containing the mercury was completely choked up by melted saltpetre which had fallen from the portfire during its combustion. These defects seem to me to constitute a most serious objection to the use of portfires; I admit, however, that these are more of a military character than my contrivances—and in this, I believe, their chief merit lies.

Explosion of the barque "Equitable."

The barque "Equitable," bound to Sydney, and laden with wheat, rice, rum, &c. while proceeding down the river in September 1839, touched on Fultah Sand, and instantly turned over in six to seven fathoms water. The wreck lay on her beam-ends athwart Fultah Channel, the keel towards Calcutta. On sounding with the lead, the water over her quarter shoaled to three fathoms, and then suddenly deepened to five or six.

Capt. Fitzgerald, the engineer officer employed, determined to attempt the destruction of the vessel by the explosion of 2,500 lbs. of powder placed between the mizen and main masts, close to the deck.

The cylinder already described was admirably fitted up, under Captain Fitzgerald's directions, in the arsenal of Fort William; before being filled with powder, the exploding tube was screwed into its side, twenty-four barrels of powder were then poured in through an aperture left at the top of the cylinder, which was afterwards closed with wood and *soldered up* with sheet lead.

The cylinder thus prepared was slung on a cradle to the bows of the "Vulcan" anchor vessel, which proceeded down the river and took up her berth at Fultah, immediately over the wreck.

At the slack of the tide, on the 14th December, the preparations for lowering the cylinder being completed, the ends of the ladder-conductor were securely twisted to the wires projecting from the explosion-tube, a piece of wood interposed, and the whole guarded by a joint of bamboo and a wedge. As the cylinder was lowered, my assistant, Mr. Siddons, cautiously permitted the ladder conductors to follow, and when the cylinder was in its berth, the conductors were cut short, so as that their free ends should reach the bow of an old fishing boat, previously moored fore and aft over the wreck. To the bow of this boat the wires were secured by twisting them round screws inserted for the purpose; the length of conductors immersed in the water was thirty-four feet.

The battery and watch apparatus were placed on the boat—the watch set to twelve minutes—and, lastly, the battery wires twisted to the conductors at the bow. The party at the mine consisted of Capts. Fitzgerald and Debude, and Lieut. Smith of the Engineers, my assistant Mr. Siddons, and myself. When all was ready, one of the wires in the battery, purposely left out of its mercury cell to prevent accident, was placed in its position, and our party pulled away vigorously from the dangerous vicinity. At the thirteenth minute a slight concussion was felt in our boat, a sound like that of a very distant and heavy gun at sea was heard, and a huge hemispherical mass of discoloured water was thrown up to the height of about 30 feet. From the centre of this mass there then rose slowly and majestically a pillar of water, intermingled with foam and fragments of wreck, and preserving a cylindrical form till it reached an elevation of at least 150 feet. The column then subsided slowly, a wreath of foam and sparkling jets of water following its descent, and rendering the spectacle one of indescribable beauty.

On pulling to the spot we found the river absolutely thickened by the wreck and cargo of the vessel. By subsequent examination, it was found that with the exception of the forecastle, the "Equitable" had by this explosion been literally torn to pieces. The fishing boat, battery, watch, &c. were all "expended."—The ladder conductors were however picked up uninjured half a mile from the wreck.

In conclusion of this paper—which circumstances induce me to publish sooner than I intended—I think it but just to express my thanks for the zealous assistance afforded me in all the preceding experiments, and in the construction of the apparatus, by Mr. Siddons, of the Medical College.

I should add, that while my experiments were proceeding, my colleague Mr. Egerton, suggested the placing of a strip of saltpetre match-paper round the platinum, in preference to placing this in contact with the powder. The excellence of the suggestion was proved by experiment, for we found on repeated trials that saltpetre match inflames at nearly double the distance at which the wire will explode powder.

The match should be prepared by immersing *cotton* in a saturated solution of the *purest* saltpetre; if the salt be impure the match is liable to become damp, and thus to frustrate the experiment. A few fibres of this cotton should be twisted loosely round the platinum wire.

It is astonishing to observe the great cooling effect produced on the platinum wire by the contact of *apparently* dry powder, if this be in the least degree damp. On one occasion with a new battery in perfect order, with dry conductors only 150 feet long, the standard platinum wire was kept for an hour in a pint bottle of powder just drawn from the canister, and no explosion ensued; but by removing some of the powder, so as to leave only a grain or two on the wire, the mass being half an inch below it in the neck of the bottle, explosion took place the instant the battery contact was effected.

I wish it to be remembered too that the preceding experiments are applicable only to explosions in *fresh* water; operations in salt water would require a special set of experiments, which I have not had the means of instituting on a sufficiently large scale. I have strong reason however to believe that the cork conductors with pitched wires will

succeed effectually in salt water also. Nay, even naked wires after having been used for about an hour as conductors in salt water are, I find, protected or insulated by the coat of oxychloride of copper, which forms on the positive wire.

In subsequent experiments I would recommend a copper or sheet-iron, water-tight, tube to be soldered round the internal orifice of the screw plate into which the explosion tube is inserted (see fig. 10 *c, c, c,*) This would constitute a separate compartment in the mine or cylinder, and in the event of leakage, that portion only of the powder could be spoiled contained within this tube. This alteration I have taken the liberty of recommending to Captain Fitzgerald and Lieut. Smith, the engineer officers employed in these operations.

Lastly, were I again to undertake the destruction of a wreck, I would employ cork conductors secured from the mine to a buoy, and from this I would float 100 yards of conductors to a boat containing the battery and the mercurial discharger. At such a distance I have little doubt but that the whole apparatus, battery, boat, &c. would escape unharmed.

Calcutta, 20th January, 1840.

Art. VIII.—*Proceedings of the Asiatic Society.*

(Wednesday Evening, the 4th December, 1839.)

The Honorable Sir E. Ryan, President, in the chair.

The Proceedings of the last Meeting were read and confirmed.

Captain F. W. Birch, proposed at the last Meeting, was balloted for and duly elected a Member of the Society.

His Excellency Sir Jasper Nicolls, Commander-in-Chief, was proposed by the President, seconded by Colonel D. Macleod.

Maharajah Rahamut Ali Khan, Bahadur, was proposed by H. T. Prinsep, Esq. seconded by the Secretary.

Read a letter from Sir G. C. Haughton, acknowledging his election as an honorary Member.

To the Secretary of the Asiatic Society.

14 *Grafton Street, Bond Street, London,* 18*th July,* 1839.

Sir,—I beg you will present my best respects to the Asiatic Society of Calcutta, and express to them how much I feel honored by the distinction they have conferred upon me in making me an honorary member of their Society. I am happy that any

little service rendered here on my part has been useful to a Society that has been equalled by few, and surpassed by no other, in the spirit and result of its labors. The names of JONES, COLEBROOKE, WILSON, and though last, certainly not the least, that of Mr. JAMES PRINSEP, (whose melancholy state of health every lover of literature, science, and generous disinterestedness must deplore) will ever form a proud subject of remembrance to the Asiatic Society of Calcutta; and make the republic of letters join in the wish of its founder—*Esto perpetua.*

I need scarcely add, that my humble services will always be at the bidding of the Society. I have the honor to be, Sir,

Your very obedient humble servant,

GRAVES C. HAUGHTON.

Read a letter from the Dutch Government, returning thanks to the Society for the books presented on their behalf to Prince HENRY of Orange, during his visit to Calcutta.

A la Société Asiatique, Calcutta.

Le Soussigné, chargé d'affaires de sa Majesté le Roi des Pays-Bas, près la cour de la Grande Brétagne, a l'honneur d'envoyer ci joint à la Société Asiatique à Calcutta, une lettre du Ministre de l'Intérieur du Royaume des Pays-Bas par laquelle Son Excellence remercie au nom de sa Majesté Neerlandaise à la dite Société du cadeau qu' elle a fait, à l'occasion du séjour de Son Altesse Royale le Prince Henri des Pays-Bas à Calcutta, de plusieurs ouvrages scientifiques destinés à des institutions savantes du Royaume des Pays-Bas. BARON BENTINCK.

Londres le 19 *Juillet*, 1839.

Read the following letter from the Secretary to the Royal Geographical Society regarding the publication of Geographical Memoirs presented to the Asiatic Society of Bengal.

To the Secretary of the Bengal Asiatic Society, Calcutta.

Royal Geographical Society, London, 1st August, 1839.

SIR,—I have the honor to acquaint you, that in accordance with the suggestion of Major T. B. JERVIS, Surveyor-General of India, the Council of this Society has resolved to present a complete set of its Journal to the public Library of each of the ten principal stations in India, and I have now the pleasure to forward a copy, consisting of nine volumes, for the library of the Asiatic Society of Bengal, which I am to request you will be pleased to present in the name of the Geographical Society of London.

In making this communication, the Council beg to express their hope that this Journal may prove useful to officers who may be about to undertake journeys in the various parts of India, and in the adjacent countries, and to make known to them, that there exists in London a Society specially devoted to the advancement of Geography, which will gladly receive, and publish in the best form, the correct account of any journey in a country of which our Geographical information may be imperfect, as is the case throughout almost the whole continent of Asia.

I am desired to propose to you the exchange, in future, of the Geographical Journal for the admirable Journal of the Asiatic Society of Bengal, which contains so much

valuable Geographical, as well as other information. Should this arrangement meet your views, the subsequent numbers of our Journal shall be dispatched to Calcutta as soon as published.

I am Sir,

Your obedient servant,

JOHN WASHINGTON, *Secretary.*

P.S.—The other nine stations are Bombay, Madras, Bangalore, Hyderabad, Mhow, Dum-Dum, Delhi, Meerut, and Cawnpoor; which I mention in order that officers moving from one station to another, and desirous of consulting the London Geographical Journal, may know where to find it.

Read a letter from H. T. PRINSEP, Esq. Secretary to the Government of India, Political Department, forwarding a Topographical Report, and Meteorological Register of Tatta, by Dr. WINCHESTER.

Library.

Read a letter from J. P. GRANT, Esq. Officiating Secretary to the Government of India, Revenue Department, forwarding for presentation the following books on the part of Government:—

Illustrations of Indian Botany, No. 9.

Dr. WIGHT's figures of Indian plants, Nos 9 and 10.

The following books were presented:—

Observations relative to the Statistical Reports on the sickness, mortality, and invaliding among the troops in the West Indies. By JAMES MOUAT, Esq. M. D. ——*by the author.*

Proceedings of the Geological Society of London, No. 62,——*by the Society.*

Transactions of the Medical and Physical Society of Bombay, Volume 2——*by the Society.*

Transactions of the Royal Society of Edinburgh, vol. 14, part 1st,——*by the Society.*

Proceedings of ditto, Nos. 13, 14, and 15,——*by ditto.*

Third, fifth, and sixth Annual Reports of the Managers of the Pennsylvania Institution for the instruction of the Blind,—*by the American Philosophical Society.*

Pickering's Eulogy on Dr. BOWDITCH, President of the American Academy of Arts and Sciences,——*by ditto.*

Constitution, Charter, and Bye-laws and Documents relating to the Pennsylvania Institution for the instruction of the Blind——*by ditto.*

A Discourse occasioned by the death of JULIUS R. FRIEDLANDER,——*by ditto.*

Proceedings of the Committee of Commerce and Agriculture of the Royal Asiatic Society,——*by the Society.*

A copy of "*Akhlaqi Jelali,*" translated from the Persian by W. F. THOMPSON, Esq. B C. S.——*by the translator.*

On the causes of Bronchocele in India and England——*presented by Dr. Malcolmson.*

Hammer's Gemaldesal,——*by the author.*

Hammer's (4 vols.) Mahmud Schebisteris Rosenflor des Geheimnis Persich und Deutch, 3 copies——*by the author*

Jahrbucher der Literatur, vols. 81, 82, 83 and 84,——*by the Editor.*

The following books were received from the Oriental Translation Fund:—

Practical Philosophy of the Mohammedan People, being a translation of the *Akhlaki Jalaly*, by W. F. Thompson, Esq.

Kumara Sambhava Kalidasæ Carmen Sanscrite et Latine edited by A. F. Stenyler.

Rigveda Sanhita Sanscrite et Latine by F. A. Rosen.

Lardner's Cabinet Cyclopædia; Statesmen, Vol. 7.

Museum.

A curious helmet used by the warriors of the coast of Mergui, with a spear and a couple of shields, were presented by a Member on the eve of his departure for Europe.

Antiquities, &c.

Read a note from Mr. James Middleton, on the silver plate presented by Government on the 3rd July last, used for taking observations of altitude, and distance. *Published in the present number.*

Read a letter from Counsellor Von Hammer, forwarding his translation of the *Mohit.*

Physical.

Read a letter from W. Scott, Esq. forwarding observations on the Tides at Singapore, for June, July, and August, and stating that in consequence of a Tide Gauge being established by Government, he will discontinue the observations for the Society in future.

Read a note from A. Kean, Esq. on the Table furnished by Dr. Stewart, and published in the Journal for April last, respecting the Hindu population, and Mortality in each Police division and Thannah of Calcutta, for the year 1837.

Read a letter from Dr. J. G. Spilsbury, forwarding drawings of Fossil Shells, with plates, by Captain P. A. Reynolds, 38th Madras N. I.

Both the preceding papers have been published in the September number of the Journal.

NOTICES.

The generous kindness of Colonel Macleod, *enables us to present our readers with the spirited and accurate sketch now published of the "Nizamut Palace at Moorshedabad." In binding the volume the sketch should be placed in juxta-position with the architectural description given at page* 552, *of the July Number,* 1839.

In our next Number will be published a sketch on stone of the explosion of the barque "Equitable," from the successful pencil of Colonel Luard. *We regret that it is impossible to complete this admirable drawing in time for the present Number.*

CENTRAL LIBRARY

JOURNAL

OF

THE ASIATIC SOCIETY.

No. 95.—NOVEMBER, 1839.

ART. 1.—*Memoir on the Climate, Soil, Produce, and Husbandry of Afghanistan and the neighbouring Countries.*—*By Lieut.* IRWIN.[1]

PART II.—OF SOIL.

90. It may appear an easy task to learn the nature of the soil in the various districts, or at least the more ostensible properties, such as colour and consistency, but in practice many disappointments will be experienced. Informants are apt to impose upon the inquirer their own petty experience, for the general truth of things; on few subjects is local vanity found so strong a vitiating testimony. Moreover, let the testimony be ever so candid, the circumstances of the case present some other difficulties. It is well known that within short distances the nature of the soil is often found to vary in all degrees. Evidence as to a small part of the district is here but little conclusive with respect to the whole, and it requires a large induction of particulars (which may not always be procurable) to establish an accurate generalization; and the terms used are often vague and of difficult interpretation. However strange, it is yet true, that the ideas of the Asiatics on colour are very different from ours, and their arrangement and nomenclature are calculated to mislead an inexperienced inquirer. From all these causes the following observations must be received, as they are offered, with distrust.

[1] Continued from p. 804

91. The immediate environs of Delhi are of a sandy soil, though not a mere sand, and generally of a yellow colour. In the northern road to Lodhiana after a few stages the soil becomes more and more loamy and black. The soil of Paneeput is a fine sandy loam. At Umbala, which lies on the left of the Kughur, the soil is a deep loam or mud, of a dark brown colour and great strength. Kughur and Sursootee running in a muddy soil are narrow and deep, and hence a slight fall of rain makes them impassable. The Markunda, which the traveller crosses between Shadeepoor and Lundee, before he reaches the Sursootee, ultimately falls into that stream; it runs in sand, and is shallow and broad. At Sirhind and as far as Lodhiana the soil has a greater proportion of sand than on the banks of the Kughur. The soil of the country of Bhutner is various. The cultivated parts are loam or sandy loam; some of the pastures contain tracts of sand hills, and others of level hard clay. Under the great northern hills the soil has a great proportion of mud, of a rich quality and much natural moisture. In the road between Delhi and Lodhiana, water in wells is found at moderate depths, but to the left hand, in Hureeana and Bhutner, we come to places where the wells are of considerable depth.

92. In the Dooab or country lying between the Sutluj and Beah, we find the soil to possess considerable variety, but on the whole it may be described as a sandy loam of excellent quality, very little elevated above the surface of the rivers, and the wells are consequently shallow. The Beah runs in sand, and sweeps away in its waters sand of a yellow colour; the Sutluj in the rainy season is more turbid and muddy. The right bank of the Beah is high and sandy, and there seems to be a gradual descent thence to the Ravee. The soil of this part of the upper Punjab has a great proportion of sand, but yet has sufficient firmness. The remaining two Dooabs have a less proportion of sand, yet little loam is to be seen. In some places tracts occur which are naturally sterile. In the upper Punjab, the greatest cultivation, though perhaps not the greatest population, is in places near the great range of hills which bound it to the north-east, the soil there having less sand and being of superior quality. On the whole strangers have too high an opinion both of the natural advantages and of the population of this province. Its water is much boasted of, and that of the rivers may deserve praise, but that of the wells is seldom good.

93. In this respect it is much excelled by the Dooab of the Hydaspes and Indus, in which the water is peculiarly good. I must be understood as speaking of that in or near the Embassy's route from

Attock on the Indus, to Julalpoor on the Hydaspes; it has been already mentioned that some parts of the country to the left, or north-east of that route, are noted for Goitres, a disease occasioned by bad water, (see paragraph 89.) The soil in the greater part of this Dooab but especially Pothwar, is a light yellow sand, which the rains cut into deep ravines in the most irregular and curious manner; every year the existing plain grounds are thus destroyed and new ones formed. Sometimes beneath the sand are seen strata of loose rounded stones, or of silt, stone, and sand, and these layers are sometimes of great thickness. Water in wells is near the surface, but the farmers are not at the expense of digging wells for irrigating their Rubbee crop, putting trust in the winter and spring rains, and the natural goodness of their land. Huzara and Pukhlee have good soils of various kinds, but yet inferior to Chhuchh; they have however greater command of water for irrigation. The soil of Kushmeer is generally loam, and in colour black or dark brown. The district of Pamper, in which alone saffron is produced, is a red clayey loam. The soil of Kushmeer and the nearest hills around it, is remarkably free from stones. The Hydaspes when low, is sea-green and turbid, its waters on reaching the Punjab are of a deep coffee colour. Its alluvial matter is loam, that of the Indus sand.

94. We return to Delhi to detail the nature of the soil in the Embassy's route thence to Peshawur. It becomes more and more sandy from Delhi to Rewaree and Kanour. The wells are of considerable depth, and the water often brackish. The country of the Shekhawuts, which next succeeds, is superior in all these respects, and the fields have occasionally a few stones in them derived from the low hills which traverse this tract. Leaving it we enter a sandy plain, generally abounding with sand hills. The depth of the wells increases at every stage till we reach Beekaneer, where it amounts to 264 feet. The water is sometimes good and sometimes brackish in various degrees. That of Nathoosur is peculiarly bad. Beyond Beekaneer the desert is commonly considered as beginning. To twelve miles beyond Poogul, or sixty-seven miles from Beekaneer, the same soil continues; but the sand hills are higher than before. Next commences a level hard smooth clay; this is locally called *Chitrang*, and it is only in such tracts that the traveller imagines he sees lakes and rivers before him. To the western edge of the desert is eighty-three miles more, and about half of this distance is clay, the other half sand, which appears to have been nearly blown over the clay. From Beekaneer the depth of the wells gradually decreases. The soil of the desert, generally considered, is not inferior

to that of Beekaneer, and where the sand and the clay are mixed in due proportions, is of an excellent quality. It is therefore neither the badness of the soil, nor the depth of the wells, as commonly imagined, that causes the desert to be so thinly peopled, neither is its water worse than that of the tracts to the eastward. There are several reasons to think it was in former times better inhabited. It is unquestionably for the interest of the British Government, that it should be utterly uninhabited and impassable; a little address and a moderate expense could effect this object even with a due regard to the rights of the present inhabitants.

95. The edge of the desert at Buhawulpoor is only three miles from the left bank of the Ghara, and the space between them from the north-west point of Sadik Khan's dominions to where the Ghara is lost in the Chunab (see paragraph 32) is seldom much more than double this distance. This narrow tract is of a soil not to be surpassed in fertility. When dry its surface has a degree of whitishness perhaps originating from a mixture of chalk; when watered it appears black. It is deep and friable, and may be called a clayey loam or mud. The Ghara when low has a whitish colour, and its water is very good. Its bed abounds in quicksands, having that mixture of fine sand and mud which seems calculated to form them. The rivers in general of the Punjab as well as the Indus have quicksands. Beyond the Ghara, on the road to Mooltan, is a tract of sandy ground, in which the wells are deeper and some of the plants and other appearances of the great desert occur, from which in fact it seems to have been cut off by the Ghara. It extends at most but two or three days to right and left of the road travelled by the Embassy; and gradually melts into the more fertile country which surrounds it. It seems to rest on clay, and the soil of Mooltan has a great proportion of clay; many of the fields give evidence of salt, and in general the soil is inferior to that of Buhawulpoor.

96. In the further progress of the Embassy from Mooltan to the commencement of the hills beyond the Indus at Punecala, the basis of the country appears still to have been clay, though in some cases the uppermost stratum be sand. At three and a half miles from the left bank of the Chunab begins the Thul of Mohummud Khan already mentioned (see paragraph 29;) it is sand of a poor quality, but not uncultivatable. It is broadest to the north, and there too the wells are deepest. In this quarter is situated Munkeera, the chief fort of Mohummud Khan, which is thought to be secure less by the strength of its own works, than the barrenness of its neighbourhood, and the scarcity and badness of the water. In the route of the Embassy the wells were

of moderate depth, but the water sometimes brackish. Towards the Indus the quality of the soil and water improves, but the country is still sandy. Mukulwad, on the other hand, beyond the Indus, is a stiff and hard clay of an ashy colour; in process of time it may assume a different character. On the one hand the Indus is continually encroaching on it, and washing it away. Where that river has mixed its sand with the original clay, the quality of the soil is plainly improved. On the other hand, towards the Daman and the hills, are considerable tracts of sand incumbent on the clay, and impregnated with salt; the rains annually bring down more sand and spread it on the clay. The original soil on the right of the Indus, even as far as Shikarpoor appears to have been clay, and clay is even now predominant; but towards the river a portion of sand has been introduced from its waters; and towards the hills sand or stones, or both, have been washed down by the rains. South-west of Dera Ghazee Khan, which is the capital of upper Sindh (see paragraph 25) on the road to Seeweestan, are the sands of Dajul, which if extensive would constitute a desert. Largee, (see paragraph 14) is sandy and unproductive. The plain of Eesa Khel is a clay or clayey loam of the best quality; it is of a dark red colour; its breadth is inconsiderable, and the Indus is daily diminishing it. The same changes in short are here operating as in Mukulwad, for here also we find a tract of barren and saline sands under the hills. The water of the Koorm after rain is of a bright red colour, and it deposits a loam of good quality. The district of Bunnoo is sandy, or a sandy loam. In the country of the Murwuts, which lies to the right of that river, and south-east of Bunnoo, are some tracts of sands very similar to those already mentioned; such also occur between Bunnoo and the districts of Malgeen and Kohat. These districts however have as yet received but little injury, from their neighbourhood possessing an excellent soil, which may be called a clayey loam. The colour in Kohat is black or grey, but in Malgeen red.

97. The original soil, and that which still predominates in the plains of Peshawur and Bajour is a clayey loam; there are now however several exceptions deserving of notice. Opposite to Chhuchh is the plain of the Mundeers, or lower Yoosufzyes, the soil of which is of the same kind and quality with that of Chhuchh. On the other side of the Cabul river the Khutuks possess the south-eastern corner of the plain of Peshawur, which is light, often stony, and of indifferent quality; more to the west, but still under the hills, are Oormul and some other places in which the soil is sandy and naturally poor. The Mihmund's lands are generally a clayey loam; and the Khuleel's

have a still greater proportion of clay. The colour of the soil is various; it requires much water and much stirring, but when properly treated bears heavier crops than most lands in our provinces. Bajour is of a like nature. The lands of the Mihmudzyes and Daoodzyes have had introduced into them by alluvion a considerable proportion of sand. The latter are thirsty, and bear but ordinary crops. Swad and Punjkora has each its river, and are less clayey than Bajour. The Gugecanee lands are clayey, but such as are near the Ootman Khel and upper Mehmund hills have a mixture of stone. The Khuleels have the firmest soil, the clay extending to a great depth, and water being at a considerable distance from the surface: hence this tribe have dug many underground dwellings, in which to take refuge during the heat of midsummer, and they are not subject to fall in like those made in other parts of the plain.

98. Teera has a stony soil, which generally contains a considerable proportion of sand. Koonur and Lughman are loams of good quality, and very well watered, and productive in rice. The former because of its wideness requires a greater quantity of water for irrigation than Bajour. Jellalabad is a sandy and thirsty soil. Under its hills (the range of 34°) there extends on the left hand of the traveller to Cabul a barren tract, in length about forty-five miles from Busawul to Nimla; and in average breadth about five or six. It is partly stony and partly sandy. Perpetual winds here prevailing, it is thought that these sands are encroaching on the good lands. The present soil of Jellalabad has probably been transported from them by the winds. The lands of the upper Mihmunds are of very various kinds. Kama is clayey and moist, Goshta is inclined to sandy.

99. We find considerable variety in the soil of Cabul. The greater part is a loam with a great proportion of clay, but stones, gravel, and sand, have been lodged under the hills by the rains. On the left hand of the traveller as he goes to Ghorbund from Cabul, is a sandy tract under the hills. It is about eleven miles long by four broad, and quite uncultivated. This is the Reg-ruwan of which many fabulous stories are told by Aboolfuzl and others. The gardens and grounds used for raising vegetables in the vicinity of Cabul, have, by long care and culture been cleared of stones, and now have a black, fertile vegetable soil, from nine to twelve inches deep. In general the lands in this valley bear heavier crops of all things proper for the climate than those of the plain of Peshawur; but this is partly attributable to the plentiful manure and assiduous culture they receive. Draw-wells are but little used, as water is near to the surface; but the water of draw-

wells in the city of Cabul is acknowledged to be bad. The neighbourhood of Ghuznee has a light soil, with a mixture of small stones. Some other parts of the table land are stiffer, as having more clay in their composition. A mixture of stones in the cultivated fields is universal, and indeed considerable tracts of the table land are so covered with small stones, as to yield but little, even in pasturage. The north has a good deal of broken ground; the south is more level. With respect to the lands of the Huzaras, they are of no one kind except that they are generally stony.

100. Mookr and Abitazee, on the road from Ghuznee to Candahar, have light soils with a mixture of small stones. The Dooranee country generally considered must be pronounced sandy. Near Candahar the soil is sandy and thirsty, but facilities exist for irrigation. In the city of Candahar water in draw-wells is near the surface, and of good quality, and few places can be named in the whole of Khoorasan where the water is bad. In general the inhabitants drink from running streams, but draw-wells are not unknown, especially within cities and in the desert places frequented only by shepherds. Between Hirat and the Persian Khoorasan there is a sterile tract, which forms an imperfect barrier. The Regimulikan would be crossed in the direct road from Jellalabad, the capital of Seestan, to Furah, and is of considerable extent. South of Soorbut the traveller crosses a desert tract forty miles broad, on the road to Goonabad and Ghaeen. In Seestan, especially the west, there are considerable expanses of sand, generally without fixed inhabitants, and sometimes without water. Between Jellalabad and Kilat of the Beeloches, the country is supposed to be generally a desert. The various desert or sterile spaces now mentioned, appear to me to have an imperfect communication with one another, and therefore do not constitute a military barrier; nay, we perhaps over-rate the difficulties they would throw in the way of the disposition and passage of troops. By digging draw-wells an enterprising and ingenious enemy would find water at a less depth in the earth than is commonly imagined.

101. Zumindawur is situated, as already mentioned, on the right of the Helbund, (see paragraph 56.) Its soil is more loamy than that of most other parts of the Dooranee country, and is of a good quality. North-west of it is the country called Seahbund, situated within the Paraparnisan mountains, and inhabited by the Tymunus, a tribe of Ymaks: part of it has a clayey soil. The Gurmseer lies south and south-west of Zumindawur. Its soil, which is naturally sandy and weak, is rendered productive by water drawn from the Helbund. The Joolgha

or plain of Hirat is a sandy loam naturally fertile, and being well watered bears good crops. The same species of soil extends to Murv, and beyond it, although the intermediate space be little cultivated. The soil of Murv is esteemed very good ; that of the Jumsheedee tribe, whose territory forms the north-east corner of Khoorasan (see para. 19, 27,) is perhaps equally good, and the Ymak vallies are in general fertile. In the Jumsheedee country, and also in Jam and Toorbut, is a great deal of broken ground. There is a less proportion of this in the country of Ghaeen, and Birjund, and in Zumindawur, but still it is considerable. Ekatool, belonging to the Ulukhoo-Zyes, a tribe of Dooranees, is remarkable for the quantity of its ravines and broken ground. Sungoo a city of Khaf has a hard clayey soil. The soil of Mushhud is good and productive. To the north we soon reach the desert of Margiana, which is generally a sandy plain, but contains some low hills or hillocks. To the east it approaches near to Muno, and north of that place joins the sands lying between Bactria and the Oxus (see paragraph 104.)

102. The great desert called Loot, lies south and west of Seestan, and divides Seestan and Khoorasan from the Persian province of Kirman. It undoubtedly communicates with deserts in the west of Bulochishtan, or those deserts form a part of it. It is throughout a sand, probably quite uncultivatable, and the edges only are visited by the pasturing tribes. It is crossed by caravans, and sometimes by small parties of marauding horse, but in these quarters those who go on expeditions, generally mount themselves on camels, as being more patient of thirst. Like other deserts its outlines are not easily traced, as it gradually melts into the inhabited country. In the road to Tubus (the westermost of that name) in Khoorasan, the last inhabited place in the province of Kirman is Durbund, which is forty *fursukhs* from the city of Kirman—at Durbund are some brackish springs ; thence are forty-five *fursukhs* of desert, to Chihlpaya, where are no inhabitants, but a tank containing rain water, and a bowree dug by the order of Nadir Shah. It is reckoned to be 300 feet deep, and the water is brackish. There is here a hill which appears as if overturned by some convulsion of nature ; it has not the least vegetation, and there is little grass or even shrub in this dismal desert. After fifteen *fursukhs* more, we reach Naeebund, where is some good water from springs in hills, and a few resident inhabitants. The country is still sandy and continues so far, several stages towards Tubus, and the population is but small. There is a road east of this road from Nil (see para. 27) to Khubees, where the chief inhabitants are Ghiljees, who settled

there during the time that the Afghan dynasty ruled Persia. This is even a less practicable road than the other, and in summer is not travelled. There are eight stages of a camel journeying almost incessantly, and no water is to be had in the whole space. This desert then may be pronounced impassable by regular troops, except in the smallest bodies.

103. Our knowledge is very scanty concerning Bulochistan. Its western parts or western boundaries are generally desert, but in some places villages are interspersed. There is a winding road from Kilat to Kirman through Punjgoor, Jalk, Dezuk, and Bempoor, but various parts of the stages are desolate; the soil even in the route I conceive to be generally sandy; the fertile spots are at the foot of hills, which yield them either by nature or by means of art, a scanty supply of water. The hilly tract on which is situated Kilat is much superior to the preceding, yet even here are several upland wastes in which even water is not to be had for one or two days' journey. The soil of Kilat seems to be generally loamy, but in some places is a stiff clay. Such feeble streams as the Buloch hills yield being soon absorbed in this warm climate, there intervenes a dry space between the hills and the sea-coast, which may be compared to the Tehama of Hejaz and Yemen. In this space Rind tribes wander, whose chief riches are their camels. The soil seems to be most commonly inclined to clay. In Seweestan, a clay or clayey loam seems to predominate, but Dajul (which perhaps belongs to Sindh) is sandy, and there are other exceptions. In Seeweestan water in draw-wells is deeper under the surface than in Sindh, but yet at no inconvenient distance. In some routes spaces occur, of perhaps forty miles broad, where neither water nor cultivation is to be seen, but there is little reason to think the circumstance owing to the badness of the soil; some were formerly well peopled. There is a tradition that the river Indus taking a bold turn to the right formerly ran through this country, and appearances are said to favor it. The lake or swamp called Manchoor, mentioned by Aboolfuzl, was perhaps a part of the bed of the Indus; it is thought to be in the south-east. Aboolfuzl tells us it is near Seewee, but this I conceive erroneous. There are some low and moist lands in Seeweestan, which perhaps were also parts of the Indus bed. There is reason to think that from other causes the rest of Bulochistan (and the remark might be extended to other countries) is drier and more barren than in former times.

104. The soil of Bactria from Mymuna to Talikan, has a great proportion of clay in its original composition; at present this is most

visible in those parts which are neither near to the hills nor the Oxus; for towards the former, the matter brought down by the rains has often changed the soil to stony, gritty, or gravelly, sometimes to sandy; towards the Oxus the soil becomes a loose unfertile sand. The sands begin at Huzrut Iman, and continue to the lake of Aral, their breadth continually increasing. In the space intercepted between Huzrut Iman and the common road from Bulkh to Bokhara, through Kilif, the average breadth of these sands, which are nearly waste, is more than thirty miles; the sandy tract opposite, on the right of the river, is not so broad. The soil of Bulk is a clayey loam, sufficiently friable, and of a good quality. That of Koonduz is very similar, and in colour black. Khoollum, and generally that under the hills is a hard gravelly clay. Talikan is a loam inclining to clay, of a good quality. Undkho has a good deal of sand, but Mymuna is a strong clay, and abounds in ravines and broken ground. About half way between Undkho and Mymuna the traveller begins to see numerous hillocks in the plain, and they continue as far as Muro, and almost to Hirat. They are composed of a good soil, without stone, and bear good grass; they are sometimes under crop, but the chief cultivation in this space is near the moist banks of streams constant or temporary. Budukhshan has a stony soil, but otherwise it is very various in consistency, colour, and excellence. Fyzabad is a sandy loam of a reddish colour, as is found in many other places. Durwaz, and the Shooghnan and Wukhan vallies have a blackish soil. The same observations are probably as applicable to Wukeeha and Keerategin as to Budukhshan.

105. The west of Toorkistan is sandy, and without artificial watering yields poor crops; hence the chief cultivation is near the banks of rivers and streams. Between Kilat and Bokhara the water of wells is usually brackish, but is found at moderate depths. The hillocks near this road are of sand, not of a good soil as those of Bactria. To the west of Bokhara is the Kurakol, an uncultivated space which extends to the lake of Aral; but it is not considered as crossing to the left of the Oxus, where begins the great desert of Margiana, so called by the ancients. The principality of Khwaruzm is thus encircled by deserts. It is however to be remarked, that the Toorkmuns who live on the edge of the river, generally avail themselves of the facilities it affords for irrigation in its flood season, and raise some crops on the low grounds near it. Water is here so near the surface, that the inhabitants often dig wells, where they pitch their tents, to serve for their use during the time they may halt. In the interior of the deserts there are wells, which have

been dug by the governments of former times; these are never remarkably deep in the Kurakol, but the water is at least as good as that of draw-wells in the neighbourhood of Bokhara. The soil too is seldom impregnated with salt, and were it the custom of the country to water lands from wells, it could be brought into cultivation. At present it affords an early grass to be pastured in the spring. That part which is next to Bokhara, was formerly cultivated. The Kurakol extends beyond the Jaxartes into the country of the Kuzzaks, but that people have also hills and declivities with a good soil. With respect to the Kirghiz country, and the east of Toorkistan, the soil has considerable variety; many places are stony; loam and clay are very common, and in natural fertility the cultivated lands of the east are unquestionably superior to those of the west. The Pamer has a rich soil.

106. In the vast extent of Chinese Toorkistan it may be supposed there is to be found all varieties of soil. That of Yarkund is sandy and weak, and sandy wastes intervene between it and Khootun, in which the Chinese Government have erected pillars to guide the travellers into the right road. The uncultivated space is about an hundred miles broad, if we pursue the ordinary road. The soil of Khootun is superior to that of Yarkund, and the cultivation considerable. The river of Yarkund passes through this country. To the north-east sands soon recommence, in which the river is at length lost, at no great distance from Toorfan. Ela and Aksoo lie near to mountains in northerly directions, are tolerably well watered, and the soil is good. Akeoo seems to be north and a little east from Yarkund, and the road is sometimes inhabited, sometimes not.

107. There remain some countries of which we have little information which can throw light on the present subject. Such are the Tibets and Kushkar. We know that they are ill cultivated, and perhaps the climate condemns great part of them to sterility. Other parts may be occupied by rocks and stones. From the particulars now detailed, it is evident that the countries most favoured by nature, are neither the upland tracts nor yet the open plains distant from hills, but those which lie at a moderate distance from their foot, and receive the water which flows from them. Lofty mountains however barren themselves, are the cause of fertility to the plains below. In the vast expanse here treated of, there is a very great proportion now uncultivated, and may continue so for ever. Some part is a loose sand or hard clay, unproductive without much water, which at the same time the climate and situation deny; another is covered with a profusion of stones. The composition of some lands seems adverse to the growth

of useful vegetables. The commonest species of this kind is saline land, which occurs at intervals in almost all the various districts which have been mentioned. A mere sand and a very hard clay seldom give evidence of this quality, which is thus found in soils otherwise of the best composition. Chhuchh, the lands of the Mundurs, and those of the Huzaras, are remarkably free from it. A certain degree of it is by no means inconsistent with fertility, nay, the natives of the west of Khoorasan, prefer land moderately saline for the raising of melons and cucumbers: some remarkable saline spots are mentioned under the subject, which next follows, (see paragraph 112.)

PART III.—OF NATURAL HISTORY.

SECTION I.—*Of Minerals.*

108. The Persian metals are not found in these countries in great abundance. Most of the streams which rise in the great northern range, or in that branch of it which forms Kafiristan, and also those streams which arise in the Belur, wash down grains of gold which the natives take pains in collecting, but it is not supposed that this business is very profitable. In some parts of the south-east of the Huzara country, grains of gold are also found. With respect to silver, if we except a little found in the country of the Kafirs, it is produced no where but in the Chinese dominions, and I am not sure whether it be in their ancient territories or their new acquistion of Chinese Toorkistan. Copper seems to have been formerly found in the district called Seahbund (see paragraph 101) and according to some it is produced not far from Nishaboor, which is in the Persian Khoorasan. The same hill which yields it, is said to yield iron and lead; but according to others, lead is the only metal produced. Between Furah and Ghaeen, is Tubus, called *Miseen* from its copper mines, and to distinguish it from another Tubus, far to the west, commonly called Gil Tubus. At present both are under the Persians. Indications of copper are to be seen in the Bajour territory. In the kingdom of Bokhara, is a town called Sherabad, about seven days south-east of Bokhara, and about two days north of Sherabad is a hill called after it which produces copper, not wrought, and also verdigris, which is an oxyde of copper. With respect to precious stones, the ruby mines of Budukhshan, once so famous in the whole world are no longer wrought. We are told that in the south-eastern parts of that country

are whole rocks of *lapis lazuli.* Nishaboor is still famous for its turquoises, which are found in a hill in its neighbourhood, that yields no other mineral product. Major Welford has mentioned lapis lazuli, hyacinths, crystal, bajor, stones of a superior quality, and marbles of various colours, being found not far from the banks of the Indus, before its junction with the Cabul river, (see his paper on mount Caucasus in the sixth volume of the Asiatic Researches) I scarcely remember to have heard of these things, but as that author's information is generally very correct on points of geography and statistics, I presume there is much truth in the account.

109. Aboolfuzl has mentioned an iron mine at Khiroo in Kushmeer, and it is still wrought, being perhaps the only mineral of any note to be found in the valley. There are numerous mines of iron near Kanee Goorm of the Wuzeerees, which lies to the north of the range of 32½°, towards its termination to the eastward. Iron is found near Burawul, and Burwa of the Turkoolnees, and also above Deer of the Yoosufzyes, lying in Punjkora. In all it is gathered in the state of coarse sand or gravel. An iron mine was formerly wrought near Dhukha of the upper Mihmunds. Near Cimnan, a city of Khoorasan, on the frontiers of Irak, iron is produced, and also in a hill four days south of Ghaeen. The existence of iron in the territory of Nishaboor is disputed; an ore of this metal is found in a hill of Chhuchh or Huzara, six miles west of Hussun Abdal. In Toorkistan there are very numerous mines of iron. In the territory of Kokum may be two, in that of Bokhara one, in that of Hisar two. Shuhursubz has one mine, the territory of Tashkund one, perhaps more. It is said Keerategin and Durwaz have none. In the territory of Fyzabad there are four mines; and in the small principality of Kolab, the greater part of which lies on this side the Oxus, between Keerategin and Fyzabad, there is one. Bulkh has one mine in its hill to the south, and Tolekan another. Notwithstanding the number of iron mines in Toorkistan, that metal is imported from Russia, and is of a superior quality.

110. Lead is very abundant in many parts of these countries. Not unfrequently it is found in the same matrix with soorma, which is an ore of antimony;* sometimes it is found alone, as soorma also is. I have heard of the following mines of joint lead and soorma, viz. two in the country of the Afreedus, one at Khakshista of the Huzaras, south of Bameean, one or two near the source of the Urghundal, two

* I am now (January 1811) assured there is also sold under the name of soorma a certain sulphate of lead, and it is natural to suppose, this is the substance here meant.

at least in Chitral, and one in the dominions of Kokur. One mine of lead is found in upper Bungush. In the country of the Shinwarees, who are west of the Afreedus, one mine. There are two mines in the country of the Kokurs, and one at Turbulakh of the Dehzungee Huzaras, who are the most westerly of all. Near Baghis of the Tymunees within the Ymak hills, the spring torrents bring down pieces of this metal. I have not heard of its being found in any other place of Khoorasan, except near Nishaboor. In Toorkistan it is very abundant. There is one mine in the hills near Bulkh; in the principality of Talikan there seem to be two mines. In the district of Undurab there is one mine, and in that of Khoost another. Lead is also found in Khirjan, which lies between Khoollum and Bameean. In Budukhshan lead is abundant, and there are three or four mines in the valley of Wunj. Some lead is also brought through this country from Kashkar and the borders of the Kafirs. Kolab has two mines, Buljeewan, which is under the lesser Kolab and is beyond the Oxus, has one, and in the territory of Hisar are two. Nooruta has one mine, and there is perhaps another in the dominions of Kokun, and one or two in those of Tashkund. There is one mine in Keerategin, probably more. Soorma without lead is found in the principality of Talikan, in several places, and is said to be abundant in Budukhshan, Durwaz, and Keerategin. Soorma is found in the country of the Besoot Huzaras, who are among the most easterly of that nation. A mineral called white soorma, is found near Dubran, which lies north of Huzara.

111. Orpiment, which is yellow oxyde of arsenic, is found near Sakhir in Seahbund, and in more than one place in the hills of Bulkh. It is also produced somewhere in Budukhshan, near Lungreeal, which is not far from Dubran; it is the ore of some metal of a whitish colour and a consistence which adapts it to be easily made into bullets. Towards Cabul and in many other places, the villagers use a certain species of gravel, called *sungisachma*, for shot. The most famous place for sulphur is Gogirduk, between Khoollum and Bulkh, but this mineral is said to be found in some other places of Bactria, to the east of Bulkh. Some is produced in the territory of the greater Kolab, and some in that of Fyzabad. Sulphur is reported to be found in the hill of Sherabad (see paragraph 188.) It abounds in Chitral, and some other parts of Kashkar, and some of it is in an oxydized state. Some is to be seen in the desert of Margiana (see paragraph 101.) There are two mines in Seeweestan, of which one is near Bhag, and one not far from Sunnee. The western Tubus is famous for its sulphur, as well as its tobacco. Some of the springs of the Kafirs

smell of sulphur. In these countries are many warm or even hot springs which could be named. The other natural curiosities known to the natives do not deserve much mention, especially as the circumstances of some seem fabulous.

112. The supply of common salt is from various sources; rock salt, that of salt ponds, that of springs, and that made from the soil. A minor range of hills has been already distinguished as the Salt range, (see paragraph 12.) Some is found at the beginning of the range in the country of the Oorukzyes, but is of little note beyond the neighbourhood. At Kala Bagh, the hill which overhangs the town, is in a great part composed of salt. Near the termination of the range, this mineral again becomes very abundant, and is found in several places. This is that which in our provinces is called *Lahouree*, as coming to us through Lahour, though all produced beyond the Hydaspes. It is of a dingy colour, whereas that of Kala Bagh, which is superior, is either so white as to be pellucid, or tinged with a red colour from the clay contiguous to it. The north is supplied from these mines, whose produce is carried even into Kashkar, where it fetches a high price, because of the natural difficulties of transporting it. It is rather heavily taxed, in Kushmeer which makes it dear. When the governor rebels, which has often happened, and trade is checked by the existence of hostilities, the dearth is still greater, in so much, that the Kushmeerees having no interval supply, have been reduced to eat red ants as a substitute. In the south of the kingdom, the demand for rock salt is not great. Some is indeed carried from Kala Bagh, as far as the lowest parts of Sindh, but this traffic bears no proportion to the riches and population of that country, and indeed seems an appendage to that in the transporting of pilgrims, who intend visiting the holy city of Mecca. The boats are sold on their arrival with what cargo they may contain, and few if any again ascend the river as far as Kala Bagh. In all parts of Bulochistan, soil salt is that chiefly used, and each neighbourhood makes it for itself. Even the Mooltanees consume more of this kind, pretending that the other is unwholesome. Candahar is partly supplied with salt from that made by boiling the water of a spring at Kushkinukhood, 40 miles on the road to Hirat, and partly from the soil; the latter is reckoned inferior. The chief resource of the west or rather middle parts of Khoorasan, is probably in salt ponds, in two different places of the country of Ghaeen. An ice-like crust is formed at the edges, when the water begins to recede in the dry season, and no further preparation is required. Besides the salt well in the Loot desert already mentioned, there is one about

40 miles south of Toorbut, and another in the road between Toon and Yezd, but none of these are of any use. Near Ubasabad, which is ten days from Mushhud, on the road to Tuhiran, is a hill which gives out two feeble salt springs, which make two bogs, and to procure salt pits are dug at the edges and filled with the brine; this gradually evaporates, and is covered with a saline crust.

It is probable, many lesser ponds and bogs of this nature exist especially in the level countries. Bokhara and Nooruta chiefly consume salt brought from places in the Kurakol (see paragraph 105.) Jizzukh has a mine of rock salt, and also salt from the plain. Samarkand is said to have one mine, Oratepa another. All the three are under Bokhara. Oorgung, Mura, and Mymuna chiefly use salt found in their own plains, sometimes artificially prepared, sometimes not. The kingdom of Kokur is not destitute of soil salt, but has besides at least four mines of rock salt. Tashkund has one, probably more, and also receives salt from the plains to the west towards the Kuzzaks. We know of two mines in Keerategin, one in Buljeewan, two in the greater Kolab, and the valley of Wakhan has rock salt, but the southern part of Budukhshan in which is situated Fyzabad, seems to have but one mine, and its produce is very bad. The eastern part of Bactria, on the other hand, is abundantly supplied, having at least five mines, and Duroona beyond the Oxus has one. One mine of Shuhisubz yields salt of a very fine quality, which is carried as far as Bulkh and Bokhara for the use of the rich. Hisar has a salt spring, and two mines very little worked exist in its dominion. Bulkh and Bokhara are partly supplied from springs found between them, partly from a place under the hills, where a crust of salt is produced. Shibirghan has a mine of very good quality, and exports to Bulkh, Undkho, and other places. I have not learnt that any salt is found within the Paraparnisan mountains, and such is the scarcity of this article among the Huzaras of the interior, that they do not use it dry but dip their morsels in a brine of it. At one time of the year the poor have none to consume.

113. Saltpetre is no where found in these countries but is made by natives, from the soil in innumerable places. It is a curious fact that the same earth which yields common salt often yields saltpetre also, although both ingredients be different; but dry situations are more favorable to it, and moist to the generation of salt. To complete the list of ingredients used for making gunpowder, it may be observed that no place is much famed for its charcoal. The best is made from the willow, and very good from the plant called uk or mudar (see paragraph 130.)

Borax is dug up near Mushhud in an impure state. A salt called black salt is found in a hill some miles south-west of Kala Bagh. The most famous product of Kala Bagh is its alum, which however is not native, but is prepared from a mixture of pure clay and sulphur, found in the same hill which yields salt. The same exists in small quantities in the quarter where the Lahouree salt is produced.

114. I have made no mention of the minerals of the Tibets, or country north of the Punjab, or those of the Rajpoot country. We know little of the minerals of Chinese Toorkistan, except that coal is burnt at Ela, in that country; and some mistakes have probably been committed in assigning the situations of mines in independent Toorkistan. With respect to the structure and general composition of the hills and mountains, it is needless offering conjectures; the hills seen by us were plainly secondary. Soft and composite rocks appear to be very common in Afghanistan, and hence it is that in a country so mountainous, few houses are built of hewn stone. The valley of Kushmeer is peculiarly destitute of stones proper for building; wood at the same time is cheap and abundant, and therefore the inhabitants erect lofty houses of that material. Good flints are found in many places in the south-east of Bactria, (from whence they are brought to Cabul) in some low hills in the districts of Muro, in those west of Sindh, and doubtless many more. Upper Bungush produces a marble much esteemed.

Section II.—*Of Vegetables.*

115. The present is a subject on which little is known. What here follows being also very imperfect, it is needless to affect nice divisions, and it is enough if we distinguish plants into three classes; first, grasses and small succulent plants;—second, shrubs;—third, trees.

1*st. Of Grasses, &c.*

116. It is moisture which chiefly encourages the growth of herbage. Those countries however are not the most verdant in which the greatest quantity of water falls in the year, but those in which there are many days of rain, dew, and mist. The water which falls in low latitudes, does so generally in a short space of time, and with great violence, so that drought prevails during the greater part of the year; hence warm countries are seldom verdant. We should be in error if we supposed that heat, as distinguished from drought, was

hostile to verdure. The season of grass in all countries begins with the renewal of the warm season, unless in circumstances the most peculiar; and even in warm countries the herbage withers at the beginning of winter. Neither are we to decide that warm countries have naturally more grass throughout the year than the cold; for if their summer be dry, the heat of the sun soon withers the pastures, which do not recover until next spring. It is evident therefore that the growth of herbage will be greatest where heat and moisture meet in due proportions. Moisture may arise from the atmosphere or from the soil; and with respect to the moisture of soils, it may arise either from the composition or a low position. It is thus that a clayey loam is better covered with grass than a loose sand or a hard clay; and many districts, the drought of whose climate would leave them little verdure, have abundant grass which is nourished by the water descending from higher situations. A new complexity is added to the subject when the periodical rains fall in the summer, and thus revive the grass which has been withered by the heat in the warm climates.

117. It is found that in India every grass and small plant has its natural seasons of putting forth its new leaves, flowering, casting its seed, and withering. Most of them flourish most in the Kureef, that is after the great rains have begun to fall. Very many however even of these put out new leaves in February and March—soon to be burnt up by the scorching winds; and some of them bear seeds in the Rubbee as well as the Khureef. Some plants naturally flourish in the Rubbee; for example, the Sehoon, or wild oat—the seeds of which are shed before the commencement of the great rains, but do not spring up until perhaps the month of October. From what has been said, it is plain that in India there are two seasons of grass—the lesser in spring, and the greater in the great rains, and for a short time after them. The winter months have but little fresh grass, but there is a considerable resource in the withered grass of the Khureef. Between the spring and Khureef grass is an interval in which the pastures are burnt up by the excessive heat and drought; if the soil be very moist, or frequent showers fall, this interval may not be perceptible. It may be supposed to be the same with every country which, like Hindoostan, has a warm climate, and its chief rains in the summer; but when either fails we no longer find these two natural seasons of herbage. When the cold reaches a certain point, the heat of summer is not sufficient to wither the grass after its commencement in the spring, and this is reserved for the cold of winter. The grains of the Rubbee, also, it may be observed, in climates where the winter reaches a certain degree of

length and severity, do not spring up in autumn, but in spring, and ripen in autumn. In warm countries which have no summer rains, the spring grass having once withered, does not recover during the remainder of the year.

118. In the Punjab and Sindh the seasons of grass are the same as in our provinces, and the species are much the same. In the upper Punjab there is perhaps more grass fit for provender than in our upper provinces, but the large kinds used for thatching are scarcer, this however is of little consequence, the inhabitants prefering flat-roofed houses covered with mud, to the thatch so common elsewhere. Hurriana and Bhutner are well known to have abundance of good grass; and the country in general which lies between the Sutluj and the Jumna is more verdant than that on this side of the latter river. The Dooab of the Hydaspes and Indus present the usual varieties. Pothwar has but little grass, except in the bottoms of the ravines. The hilly country of the Gukhurs, and others already mentioned to the north, appear to have much grass, but this does not arise from the great growth but from the small consumption. In the Thul of Mohummud Khan, as in the great desert, we find more shrubs than grass. Mooltan, and upper and middle Sindh, have little grass. The spring of Peshawar is naturally later than in our provinces, and the rains which then fall have an additional tendency to protract the time of fresh grass. The lateness of the summer rains, and their comparative unimportance, makes the Khureef grass later in commencement, and causes it to be little superior to that of the spring grass in this country; it is even said that in Jellalabad the spring grass is of more importance than the Khureef. In Seeweestan though the summer rains are scanty, the Khureef grass is superior to the other kinds; but herbage is not abundant in that province. Peshawar, though its summer rains are deficient, has yet as much grass on an average of all months as our provinces, for showers fall at different times of the year, and the soil is good. The name of Shurhsubz which Tymoor gave it, we may suppose alluded rather to its constant succession of green crops, than the exuberance of its natural vegetation in grass, which is not extraordinary. The least quantity of grass is in the middle of winter and the middle of summer.

119. The seasons of grass in Chhuchh, Huzar, Kohat, Malgeen, Eesakhel, and Bunnoo, are nearly the same as in Peshawar, and the quantity not very different. Mukulwud has but little grass, but some parts of the Daman have a great quantity. The hills called Bedaulut, owe their name to the scantiness of their herbage. The hills of Bajour,

Punjkora, Swad, Bhooner, and Pukhlee, afford abundance of grass in the summer; and the plain of Bajour is even more verdant than that of Peshawar. The grass of Koonur is inferior to that of Bajour, and that of Jellalabad to Koonur, but Lughman is superior to both. Kushmeer, and the hills which surround it, have a very abundant herbage in summer, but it is not reckoned nutritious; in the winter the sheep and other stock are house-fed—a management probably more judicious than if they were kept on the grass remaining under the snow, or were driven to a warmer climate.

120. A great part of the surface of the districts of Cabul and Ghuznee is covered with stones, and the soil is in other respects unfavorable to the growth of grass. The new leaf appears in April, and there are but few places, where it is affected by the summer heat, or withers until autumn. If the soil be moist and has been well covered by snow, the grass remains green even during the winter, but makes very little progress in the spring. It may be observed, that the grass of sandy soils appears earlier and also decays sooner than that of other soils. In the winter the sheep of these upper countries are driven to warmer climates to the eastward, and have been known to come as far as Husun Ubdal. It would be difficult to estimate whether the cold or the warm countries here have most grass during the year on a given surface. In the summer, that of the cold is most luxuriant, but in the winter there remains little beyond some withered herbage under the snow; whereas in that season the warm countries have a certain degree of verdure remaining, especially after a shower, and when the surface is free from snow. The nature of the soil too has an influence, and the upper countries are the less productive of grass, as much of their surface is covered with stones. Cabul is proverbial for a scarcity of fodder, but this does not arise from the nature of the soil, but from there being a great number of horses and other animals, and but little ground for pasturage left uncultivated.

121. Khoorasan has a dry climate, and no summer rains; hence its temperate and warm parts have very little herbage. Bulochistan has still less, and Seestan is ill supplied. Sheep and goats are seldom kept in the villages, but pasture during all seasons at a moderate distance from them. There are indeed certain parts, particularly in the Dooranee country, where the flocks return to the villages after the grass has been burnt up, and are subsisted on straw and other products of agriculture or gardening, with some assistance from the meadows which are not withered by the heat. A considerable part of the Dooranee flocks are driven in summer to the

country of the Ymaks, where they find plentiful pasturage. The Ymaks do not, on the other hand, resort in the winter to the country of the Dooranees, which has less herbage than their own, though warmer, but returning to their *kishlaks*, or winter residences in the vallies, subsist their flocks partly on what grass they can find in good weather, and partly on what has been cut for them in the autumn. The Huzaras, in a climate still more severe, reap great quantities of grass for their sheep, which are seldom unhoused during three months of winter, but sleep under the same roof with their master. Grass is very abundant during the summer in both countries. Bactria too, with the exception of the sandy spaces, is a verdant country and has many meadows, which are always green. In the plains the snow is seldom so deep as to prevent the cattle reaching the grass, but among the hills it is found prudent to provide in part for their provender by a stock of grass, cut in the autumn. The reaping of grass is very common in Kushmeer and in parts of Pukhlee, Bhooner, Swad, Punjkora, Cabul, and Ghuznee, but in general the sheep which have not gone to the low countries are driven out to feed on the shrubs and withered herbage of a hill exposed to the sun, which has been reserved for this purpose. Straw also composes a great part of their food.

122. With respect to Chinese Toorkistan, we have little information. Yarkund and the sandy tracts (see para. 106) have but little grass. Khootun is in this respect much superior, as in most others. As to independent Toorkistan beyond the Oxus, generally considered, it is not inferior to Bactria, but within it we are to distinguish—1st, the dry sandy plains—2nd, the moist plains and meadows—3rd the little and lower hills—4th, the high hills and elevated plains. The first has least grass; the new leaf which had been nourished by the snow is on the 20th March about three inches long; after three months it withers from the heat of the sun. The meadows have abundance of grass, which is continually renewed. Some banks of rivers have a close sweet turf, but the meadows in general afford a deep grass. The lower hills are better clothed with grass than the dry plains, but are not equal to the meadows; their grass has nearly the same periods as the former, and on a given surface perhaps supports during the year an equal number of animals. The hillocks, are, in the country beyond the Oxus, of sand, and bear a scanty grass, which soon withers. In Bactria and Muro the hillocks are of a good soil, and bear good grass. The high mountains and plains of Toorkistan have a grass which makes little progress in the spring, but grows luxuriantly in the summer, sometimes exceeding a man's stature, and it does not wither until autumn; the inhabitants

reap a portion of it for the sustenance of their stock during winter. In the west of Toorkistan this practice is but little known. In districts, such as that of Samarkand, which are well cultivated, the stock, which is not very numerous, is fed on straw or hay. Where natural pasture is near and plentiful, they are driven out to it even in the depth of winter; hence an extraordinary fall of snow causes a great mortality among them. It is still more fatal to the stock of the Kirghizes and Kuzzaks, who inhabit a more rigorous climate, and having little agriculture have less resource when the surface of the ground is covered with snow. They make no provisions of dry grass, in which we are not altogether to blame them as improvident, for some have scarcely a fixed residence for winter; and the flocks are so numerous, that it would be difficult to provide sufficient provender for all. Some of the Kirghizes frequent the Pamer, which bears a most luxuriant herbage, but by reason of the cold it is not pastured more than a third part of the year. On their return, they feed their flocks in the warmer vallies below, until the heavy falls of snow and severe cold force them to retire to their *kishlaks* in the vallies, near which they have left forage remaining for the wants of winter. The sheep remove the snow with their feet, or if too deep they follow the track of the horse, where he has uncovered the herbage. All the animals drink the snow in this season. It is thus the quantity of herbage and its natural seasons, determine the mode of life of a great part of the population.

123. Pasturage may be divided into two species, the shepherd remaining in one climate, or visiting another different from his own. In warm or temperate climates far removed from any other, he feeds his flocks all the year near his own village, and according to the distance, brings them back to the village by night, or not. In very cold climates when circumstances prevent an access to more temperate ones during the winter, they subsist in that season on reserved pasture, on the grass which has been reaped, or on the straw or other products of tillage. But when in the same neighbourhood there are warm plains and cold mountains or upland plains, nature lays the foundation of a more erratic life, the flocks being driven up in the summer and down in the winter. Sometimes there are constant inhabitants in both the upper and the lower countries. It is thus the Ghiljies, who stay in the elevated country of Cabul and Ghuznee, send part of their flocks in the winter to the various warm countries, from the most southern parts of Daman to Koonur and Jellalabad. In the summer the inhabitants of these countries send a part of their sheep to the upper country, but the proportion is not considerable. Sometimes the

habitations of the people are in the vallies and plains, and they frequent the hills and upper plains in the summer—this is the practice of Kushmeer, Pukhlee, Bhooner and Punjkora. Sometimes they reside in the high country—it is thus part of the Kafirs leave their high hills in the winter to pasture their goats among the low ones, and the declivities. The Afreedies too in general stay in the upper part of their country. During the summer the shepherd shelters himself under trees or rude sheds of grass; in the winter he removes to low hills, where he finds natural or artificial caves in the rocks to receive him and his flocks by night. Some of the Dooranees near the Helbund construct habitations for themselves from the branches of trees and mud. The Dooranees, in general, Ghiljies, and Beelochees live under black tents; the Ymaks, Huzaras, and nations of Toorkistan use *khirgas* made of felt and wood, or *kuppas* made of felt and reeds.

124. Some details might be given of the species of plants found in these countries, but they would be little interesting. A considerable number of spontaneous products form articles of food. The chief are the lotus, the ruwash, some of the fungins, a kind of wild vetches, a plant bearing some resemblance to the turnip, the roots of the tulip, the leaves of the plant in India called paluk,* and the seeds of some of the gramina; other plants are used in medicine, and perhaps we have here something to learn of the natives. Perfumes are extracted from others, for instance from the grass which in India is called Gundhel or Mircheeagundh,† and which according to some yielded the spikenard of the ancients. The well known dool‡ grass of India seems to extend over all these countries, some parts of which moreover have superior species. Two of these called Rishka§ and Shuften‖ are also artificially raised. The Surkunda appears to extend to the utmost verge of our inquiries to the north-west, and it is not so much from the want of proper grasses as from other circumstances, that in the countries of the west a thatched house is scarcely to be found; a flat roof with a balcony, or a vaulted one without it, are substituted. This last expedient is resorted to wherever wood is dear. Of noxious vegetables, there is none worthy of mention except it be the Bhoart. This abounds in the country of Beekaneer and the neighbouring ones, as far as our military station of Lodhiana, the sandy parts of the great Indian desert, and in some quarters of the country between the Hydaspes and Indus. Its seed which is some-

* A species of beet. † Andropogon, nardus vahl.
‡ Panicum dactylon. Linn. § Sueerne. ‖ A kind of trefoil.

times gathered, and even sold at a considerable price, is covered with several sharp prickles, which readily attach themselves to clothes, and are with difficulty taken out. However insignificant they may seem, they are the chief annoyance to a traveller. Beyond the Indus, and a short distance from its banks, we do not find that grass which yields the khus* so useful during the hot winds in India. In these countries tattees are not much used except in the hottest season, and then only by people of condition. The plant employed is the Juwasa† of India, in Peshawar called Jhoy, and by those who speak Persian Shooturkhar, from its being a common food of the camel; besides these uses, in some places it yields manna, for example, the neighbourhood of Candahar and Hirat, and the banks of the Chilchick (see paragraph 45.) This precious substance exudes from it after the spring rains are over, and is collected by merely shaking it off. It is also produced in Toorkistan, on the dark barked or cultivated willow, and from some other plants.

2nd. Of Shrubs.

125. These countries have shrubs and low trees of several varieties and in great abundance. It may be remarked that they are most abundant in unfertile and uncultivated places; whether it be that such is their peculiar situation, or that they occupy places refused by the herbs and succulent plants and by the timber trees I know not. Some insinuate their roots among rocks and loose stones; some grow on the hardest clays and merest sands, and in the driest climates; and others overspread the salty deserts. Though humble, they are however useful, and demand some of our attention.

126. Some furnish food from their roots, barks, flowers, or fruits. The last only is worth mentioning, and the most remarkable species is the barberry, which abounds in the east of Toorkistan, the Ymak country, the skirts of the great northern range, and some parts of that of 34°. It is little cultivated, but that which is raised in Ghaeen is much esteemed. The plant in India called Jhurbeereeat extends to the foot of the hills in the northern and western directions. The Byr, which is said to be merely a cultivated species of the barberry, is raised in Peshawar but not in Khoorasan or Toorkistan, where instead of it is cultivated the Connal, a fruit which much resembles it in taste and properties, and is found wild in the hill of Bajour, in Pukhlee, some parts of Persian Khoorasan, and probably many other quarters. On the low hills in the east of Afghanistan, and those south of Kushmeer, which yield

* Andropogon muricatum. Linn.

† Hedysarum Alhaji. Linn.

berries; such are the goorgoor, moomanee, kookee, simloo, gurinda (the Kurounda* of Hindoostan) and some others. By the banks of streams there is found a plant which bears a fruit intermediate between the raspberry and bramble. The wild grape is found both in the warm and cool climates, but disappears in very cold ones; its fruit is sour, but is sometimes eaten either fresh or fermented. In the countries of the west, sugar being dear, various substitutes are found for it, for example, preparations of dates and other fruits, and a preparation of the sugar melon and honey; but perhaps the most common is what is called Doshab, which is sometimes made of apples or mulberries, but oftener of grapes, wild or cultivated, the juice of which is boiled to a consistence.

127. Where grasses are plentiful, as in Cabul and the cultivated parts of Khoorasan and Toorkistan, a spirit is extracted from them. In the Punjab and Sindh coarse sugar is the chief material from which spirits are extracted, but the inhabitants of the latter sometimes use the date alone, or mixed with sugar, and in the Punjab the same use is made of a fruit called Umlok, which is both wild and cultivated.

In some villages of Cabul a strong drink is extracted from mulberries, and in Kushmeer from pears. In Keerategin, and other parts of Toorkistan, there is a coarse grape called Muska, this they gather, boil, and afterwards dry in the sun. A water melon is now opened at one end, and about nine of these grapes are inserted and forced into the substance of the water melon, which being done, the orifice is shut up by re-applying the piece which had been cut out. In seven or eight days it is found that both substances have fermented, and the pulp of the water melon is converted into an intoxicating liquid fit for home use. But in Toorkistan the favorite liquors are Koomiz, made from mares' milk, and Boza, made from rice; these liquors are both wines, not spirits; they are somewhat acid, and are reckoned wholesome. Koomiz is not considered as coming under the prohibition of the law of Mahomet; but in most of the principalities, especially where the Tajiks bear sway, Boza is strictly forbidden. Although these prohibitions, whether serious or not, are quite ineffectual when they are met by a disposition to elude them, both Koomiz and Boza are less consumed in the great towns than among the pasturing tribes; yet on the whole there is less intoxication among the latter, for the people of towns indulge themselves in opium, the wine of the grape, and

* Carissa Carandas. Linn.

various preparations of hemp. Not only in these countries but in most others, intoxication is commonest in cities and crowded neighbourhoods; whether it be that company invites conviviality, and conviviality leads to excess, or that the real and imaginary ills of life being more oppressive where population is accumulated, the miserable are driven to this resource to procure a temporary relief in forgetfulness; a review of these countries will furnish no arguments for the common opinion, that climate influences this part of the character. The force of example is much less doubtful, and the colonies of Persians settled in the Afghan dominions still retain the love of wine for which their ancestors were noted.

128. Very many wild shrubs and wild trees furnish materials for dyeing, but the natives seem to have no secrets in this art. The cultivated dyes are chiefly indigo, turmeric, bastard saffron,* and madder. Indigo is unknown in the countries of the west, which are supplied from Mooltan and the neighbouring countries. Turmeric† is raised in Peshawur and many other places on the east side of the hills, but Bunno and Beer, a district of Pukhlee, are the most famous for it. It is not raised in the cold countries, or in the west. Bastard saffron, a more valuable product, is not raised in very warm situations, and indeed seems confined to Kushmeer and Ghaeen. The plant in India called Al‡ is found wild in Bajour and many other places on the east side of the hills, but is not used as a dye, though valued for its cathartic quality. The madder plant does not seem adapted for warm climates, yet some is cultivated in Gunduwah. It is raised at Kilat and Mungoochur, in Bulochistan, and some parts of Toorkistan, but its chief seats are Zumundour, and the country from Cabul to near Candahar. What comes to India chiefly passes through Candahar and Shikarpoor. Logwood, or rather sapan§ wood, grows on the mountains of Kushmeer, but whatever conjectures may be formed, I have found no evidence of its existence beyond the Indus until we reach Mazunduran. Toorkistan is supplied with it and kermes from Russia.

129. For tanning and colouring leather the bark of the almond, the leaves of the Kushnar‖ tree, a shrub called Barik, and many others are used. In all cases a lye of lime and alkalies is required. Leather is ill prepared in Afghanistan, and the people of the hills are fond of

* Carthamus tinchorious. Linn.
† Curcuma longa. Linn.
‡ Morinda cihifolia. Linn.
§ Caexilpina sappan. Linn.
‖ Bauhinia sp.

wearing shoes of undressed leather. Still simpler are those called Chuplee, woven from the leaves of a plant which the Afghans call Muzir, and the Peshawurees, Putha; it grows to the height of a man, but in general is under that height. It is not found in the cold countries, but extends to a certain height on the east side of the hills, beyond which is Khoorasan and Toorkistan. To the south it is found in some parts of Seeweestan, and to the east it is not known beyond the longitude of Husan Abdal. It is of the palm kind, and perhaps is yet undescribed. It bears a small fruit, which ripens in July. An Afghan will make a pair of chuplees in a single hour during a halt; they are tied on the feet like sandals. The Kushmeerees make sandals of rice straw.

130. The Assafœtida* plant is produced in great abundance towards the source of the Ghorbund river, and also near Isfizar (which is three days from Furah), and some other places in the west of Khoorasan. It prefers a cool climate, and the only cultivation bestowed on it is to shield it from the sun. Assafœtida is more consumed in India than in the countries of its production, where however it is used in food and also medicinally. Many other shrubs furnish articles for the native materia medica. Blisters are made with the leaves of Kureel, a plant well known in India and also in Peshawur. The plant called Akt or Uk, has a white corrosive juice, which the Rajpoots give to their infant daughters as a poison, when they do not intend to bring them up. This plant yields charcoal, and is good in tanning, dyeing, and pharmacy. The sacred Toolsee‡ is found in all these countries among shrubs famous for the beauty of their flowers, but the most remarkable is that called by the natives Urghuwan, or Anemone shrub. It grows in some parts of Cabul, Budukhshan, and Durwaz. In Durwaz it grows to the height of twenty feet; spears are made of its wood, and it is a common fuel.

131. Shrubs are the chief fuel in these countries, generally considered, though there are some districts where more use is made of forest timber or the branches of large trees, and others in which the chief resource is the dung of animals. Caravans sometimes find a difficulty in procuring fuel at uninhabited stages, but few towns can be mentioned where this article is dearer than in our provinces. It is dear in Candahar and Cabul; and in the latter a great quantity being required, it forms an important part of the expenditure of the poor.

* Ferula Assafœtida. † Asclepias gigantea. Linn.
‡ Ocimum sanctum. Linn.

The rich Cabulees chiefly burn the wood of four trees—the mulberry, mastich, oak, and bulhuk, a tree so called in Cabul, and by the Persians *kurghuna*. The poor content themselves with a fuel of shrubs or dung, and the dung of horses is eagerly carried away from the streets. The pasturing tribes bring the dung of sheep for sale, which in the city is used as fuel, but in the villages as manure for grapes. The capital was a good deal distressed in the winter of 1801, when the Ghiljies of the neighbourhood interrupted the usual supplies of fuel.

132. In the Indian desert there is abundance of the plant which, after the Arabians, we call Kali, and the same is found in some other quarters. By the Persians it is called Ishkar, but I apprehend this name is given to some other alkaline plants, particularly to that known to the Hindoostanees under the name of Lance, and which is plentifully found in the Indian desert, and also in the wastes of Khoorasan, Bulochistan, and Toorkistan. In these quarters are at least two other plants of an alkaline nature; the pasturing tribes wash by means of the leaves and flowers of these plants. The Lance is thus used in Jellalabad. A common practice is to burn them and use their ashes. Near the Indian desert great use is made of the ashes of Kali, and many in Toorkistan and Khoorasan use those of the Lance. By the addition of fat a true soap is formed, and this is preferred by the more civilized part of the population. The soap of Hindoostan is superior to that of all those countries, but Toorkistan and Bokhara are noted for this manufacture. In Kushmeer and Bajour meal of the Oord is substituted for an alkali, but in all cases a proportion of lime is added.

3rd. Of Trees.

133. The trees best known in India, for example—bamboo, mangoe, tamarind, neem, bukaen, seesum, sal, the banyan tree, peepul, firs, peeloo, kudum, lusora, bēl, jamun, khinnee, kuchnar, umlats, tota, semur, pakur, moursuree, senjhna, jand, dhak, babool, kyr, burhur, kuthur, aoonla, gondee, kumrukh, toon—are quite unknown in Cabul or the countries beyond it, and very few of them are to be seen in Kushmeer or Peshawur. The bamboo is not known beyond Khanpoor of the Gukhurs, nor is it found in any part of Sindh, or even of the Sooba of Ajmeer. The mangoe is cultivated in Sindh, but Tymoor Shah unsuccessfully attempted to introduce it at Peshawur. The mangoe is cultivated at Keech, in Bulochistan. The plantain does not bear fruit beyond the 33rd degree of latitude; it is unknown in the cold countries, and does not extend far into Bulochis-

tan. The tamarind and neem become rarer as we leave our provinces, and are unknown in Peshawur, as are the kudum, bēl, khinnee, tota, moursuree, jand, kyr, burhur, kuthur, kumrukh, dhak, and some others. In Jellalabad are lost, in addition to those, the seesum, banyan tree, peepul, lusora, jamun, kuchnar, umlats, semur, senjhna, babool, peeloo, aoonla, and some others. The date tree reaches Jellalabad, but extends no further in this parallel. In the south it extends through Bulochistan into Perna; and in Bulochistan it is very abundant, and a main support of the population. In Kilat however it is not found by reason of the cold, nor is it seen in Toorkistan or in any part of the north of Khoorasan.

134. In India gum is extracted chiefly from various species of the genus mimosa, which includes the kyr, babool, jand, and chhokur, of which the last only reaches Peshawur, but there is a species of mimosa, bearing a great resemblance to the first, but not found in our provinces. It is very common on all the low hills between the Hydaspes and Indus, and is called Pholoo, and yields gum, which besides being useful in medicine is sometimes eaten. It does not grow in the cold climates. It has been used with great advantage as a hedge round a fort. In Cabul and the countries of the west where none of this genus are found, gum is extracted from the cultivated trees of orchards, the jujube tree, the wild almond shrubs, and the mastich. In Toorkistan the gum mastich is used for fixing colours in the dyeing of chintz. These are not the only trees from which gum is extracted both towards India and in the west. The jujube is not seen east of the Indus, perhaps is not seen east of the valley of Cabul, but there, and in the west, it exists both wild and cultivated. The mastich is not very abundant on this side the Indus, but beyond that river it is found on most of the hills, except the warmest, and it bears the cold of the Huzara mountains. To the west it extends to Persia, and in a northern direction it crosses the Jaxartes. It is seldom found far from hills.

135. There is a certain plant in Toorkistan, and elsewhere, which is called Seehuk, and its roots yield a coarse resin. The pine species yield the best, and tar is also extracted from them. In remote situations it is more common to rive the tree with wedges than to saw it into planks. Pines are not found in all situations even of the cool countries, but prefer the steep sides of hills, never being found indigenous to plains or tame featured hills. There are some now growing at Herat planted by the late Nooa Moohummud Babunee. They are plentifully found on the sides of the great northern range, and the Bebur,

(with their various branches of a steep character and moderate height,) in the middle of the range of 34°, in nearly the whole of that of 32½°, in the beginning of the salt range, on the mountain called Tuchti-Sooliman, on the lofty mountain Bunseekurn, and the Jadran range, on the Ootman Khel hills, on the Aktan hills in Toorkistan, and some of the mountains of Chinese Toorkistan. Pines are also found in some spots of the Kokur country; Cabul is supplied from the mountain of Kulkucha, about three days to the east. Bameean, Ghuznee, the Huzara and Ymak countries have no pine trees. Some are found in a few spots of Bulochistan. The natives distinguish at least seven kinds, but all are not found in the same quarters. Toorkistan and Kushmeer do not seem to possess that species which is called Julghoza, and which bears a large cone, the seeds of which are idly supposed to possess many good qualities. Another species by the Afghans called Shouty, is remarkable for its being so combustible that the natives use it as a torch; this too seems unknown in Toorkistan. I have received no hint of the larch or any other deciduous species of the pine being found in any of those countries. It may be observed, that the fall of the leaf does not take place even in the same species at one time in climates so different. In Peshawur most trees retain their leaves till near spring, but in Cabul, Khoorasan, and Toorkistan the autumn frosts shed the foliage.

136. Evergreens, besides the pines, are but few. It may be conjectured holly grows on the lofty mountains, but I have never received any hint of it. The cypress is chiefly known as a cultivated tree, but is found wild in some situations. Excepting it, the natives reckon the chinar or sycamore, the most beautiful of trees. Some are found at Lahour, but are certainly not indigenous. There are two species, the Chinar or Sufeda, which has a broad shade, and the Punja-chinar or Sufedar, which grows slender and tall. The Chinar is indigenous in Kushmeer, Khost of Bunnoo, Goorzwan in the Ymak country, Durwaz, and various other situations. It prefers a moderate climate inclining to cold, deep valleys, and a moist, fat soil.

137. The same situations are most favourable to willows, but some of them are seen growing in all climates, from the plain of Peshawur to the country of the Huzaras. This is perhaps the only tree which withstands the cold of the Pamer. The willow is banished only from the hot and dry plains, and some peculiar situations. There are several species, but four are the most known, viz.—the weeping willow, which the natives call Mujnoon, and value for its beauty, the Bedi Mooskk from which is extracted a perfumed water, the green willow which is the commonest of all, and the red, which grows straight and

tall. The two last are used in building, chiefly for rafters of houses, and insects do not eat their timber. All the four species are cultivated, though some more than others. In Kushmeer and some other places the twigs of willows are given to cattle. In none of these countries are osier baskets made.

138. It is probable that the high mountains have some English trees which we cannot identify from the descriptions of the natives. The birch is plentiful in Kushmeer, and also many places of the Belur mountains, yet its bark is imported from Russia into Bokhara, where it is used to stuff saddles—an article there manufactured of good quality. The only species of oak is that known in systems by the name Quereus Bilote, which does not become a great tree. It is not found in Khoorasan, or Toorkistan, or in the warmer countries towards India; the Cabulees call it Buloot. I know not what are the trees called Seah, Chob, Bulhuk, Pudda, and Gurung.

139. The mulberry grows wild over a vast expanse of country, yet is rarely seen in the plains. It grows in the vallies of all but the warmest hills. Its fruit is much improved by cultivation, and it has varied into at least twelve varieties, all of them good. There is a difference in their ripening, but the mulberry harvest generally speaking coincides with that of wheat and barley in the same climate. In various parts of Toorkistan the mulberry is very important to the natives, furnishing a fruit, a doshab, and when preserved a considerable article of food. Now here is it so important as in Punjsher, where the natives grind it into flour, and this forms the chief food of the country. The mulberry plantations are so extensive that they are not walled in, and some individuals are said to possess ten thousand trees, but this seems an exaggeration. A very good tree will bear ten maunds of mulberries, and if the average produce be one-third of this, it is calculated to support a far greater population than tillage. The produce is little affected by the seasons and is remarkably equable.

Silk is not made except in certain quarters. Kushmeer raises enough for its own scanty consumption, but Peshawur and other countries of the east are supplied from abroad, chiefly from Goojrat, and our provinces. To the west the first place which produces silk is Gundumuk, in a temperate climate between Cabul and Jellalabad, but there is none in Cabul or Ghuznee; considerable quantities are raised in the Afghan Khoorasan, but less than in the Persian part of the province and in Toorkistan. Great quantities are raised in Khootun.

140. The pistachio tree is confined to Toorkistan and that side of the Paraparnisan which lies towards it, but it is little cultivated. The wild

almond shrub (which when cultivated attains a great size) is very common in many places, but its fruit is not eatable. An oil esteemed in medicine is extracted from the stones both of this and the cultivated sort. The oil of walnuts is so cheap in Kushmeer, that it is more used in food than any other oil or fat. The tree requires a colder climate than the mastich, but like it is found in the very cold ones. Where it is naturally very abundant, it is not cultivated. A good tree in perfection will bear, it is said, forty thousand walnuts in a season, and two thousand in Cabul fetch a rupee when cheap. The wood is good for some purposes, by reason of its strength and hardness. The natives are not accustomed to use olive oil in their food, but apply it to medicinal purposes: this plant grows on most of the low hills. Though it is not found in Cabul, Toorkistan, or Khoorasan, it is plentiful in some places between the Euxine and Caspian.

141. Nearly all the species of fruits cultivated in these countries are also found natural in some parts of them, chiefly in the vallies of cool and cold mountains. These are the apple, pear, cherry, plum, apricot, peach, quince, and pomegranate. The fig, though found in most of these climates seems yet to prefer the warm. The *naring*, a species of wild orange, grow on the hills south west of Kushmeer.

142. Of these countries Kushmeer has probably the greatest variety of indigenous species, and is at the same time as well wooded as any. It may be remarked that the same situations are generally well wooded which have been already described as favourable to the pine (see paragraph 135), the steep sides of hills being favourable to its growth, whether it be that forest trees love shelter, or because they are here best secured from animals. The low hills are not so woody as the high, being more affected by shrubs and low trees of little use as timber, than by forest trees. On the whole these countries are but ill wooded, though superior to Persia. Toorkistan, excluding the deserts of the west, is on the whole superior to Afghanistan, and the northern part of that country to the southern Bulochistan has very little wood. The plains of these countries have naturally but few trees and (contrary to what takes place in most countries of Europe) they become better wooded with the progress of cultivation. Few of the natives plant for timber, but a good deal is yielded from the numerous orchards of the countries of the west, which have been planted for fruit.

(To be continued.)

ART. II.—*Journal of a trip through Kunawur, Hungrung, and Spiti, undertaken in the year* 1838, *under the patronage of the Asiatic Society of Bengal, for the purpose of determining the geological formation of those districts.*—*By* THOMAS HUTTON, *Lieut., 37th Regt. N. I. Assistant Surveyor to the Agra Division.*

PART I.

Towards the close of the year 1837, a proposal was made to the Asiatic Society of Bengal, to undertake, with their patronage and assistance, an expedition into the Spiti Valley, where the late Dr. Gerard, some years since discovered the fossil exuviæ of marine mollusca; but which interesting discovery was never followed up by a close examination of the geological formation in which they occurred.

The proposal meeting with the approbation of the Society, I proceeded with as little delay as possible to Simla, whence in a few days having completed my arrangements, and procured all necessaries for the journey, I started on the 14th of May, 1838.

So many travellers have at various times passed over the first four stages of my journey, and the appearance and productions of the country from Simla to Kotgurh have been so often described, that it would be tedious to repeat the information already published; and I shall therefore pass over the four first stages of my trip and commence my notes from the military post of Kotgurh, where I arrived on the 19th of May.

Here previous to starting for Kunawur, I received a visit from a vuzeer of the Bussaher Rajah, who, at the kind suggestion of Colonel Tapp, the Political Agent, furnished me with some information regarding my route, and also sent with me one of his Churriahs or Chupprassees, to accompany me as far as Spiti, in order to procure provisions for my followers, and to give any assistance which his knowledge of the people and their different dialects would enable him to furnish.

From Kotgurh, the road winds down a steep and somewhat sudden descent of about four thousand feet to the bank of the Sutledge, along which it continues, with an occasional moderate ascent and descent, to the village of Dutnuggur, which is generally the first stage towards Rampore.

To avoid as much as possible the heat of the march, which along the bed of the river is little inferior to that of the provinces, I took the

pugdundee, or village road across the brow of the hill, by the village of Logo, where iron is procured, which is also a nearer route than by the descent to Kaypoo. A walk of about three miles and a half brought me gradually down to the Sutledge, where the thermometer which at Kotgurh at sunrise stood at 54°, now rose at ten o'clock A.M. to 98°; this sudden change of climate from temperate to torrid was by no means an agreeable transition to a pedestrian traveller, with more than half his march still before him. Passing the village of Neert or Neertnuggur, a few miles farther on brought me to Dutnuggur, and the end of my day's journey, right glad to seek a rest and a shelter from the burning sun, beneath the grateful shade of a large burgut tree.

The presence of this beautiful tree is of itself sufficient to stamp the character of the climate of Dutnuggur, and looking around we find along with it the peepul, the bukkine, the pomegranate, and the plantain, with many shrubs abundant in the hot provinces of India. All these, with the exception of the burgut, are indigenous to the soil, but that noble tree was long since brought from the plains by some traveller now many years dead and gone, and the date even of its arrival is now alike forgotten with the name of him who brought it.

Beneath the shade of its spreading branches I pitched my tent, and amused myself until the arrival of my baggage, with watching the parrots and minas as they threw down in showers the red fruit with which the tree was loaded; even in this delightful shelter the thermometer stood at 92°, while in the sun it rose to 120° at 12 o'clock.

Those who have figured to themselves the valley of the Sutledge to consist of a large river winding beautifully through a broad and fertile vale, well cultivated and studded with habitations and villages, will feel a degree of disappointment and surprise, on finding it in reality to be no more than a steep and rugged mountain glen of unusual grandeur, with a broad and rapid torrent roaring and foaming as it rushes impetuously along the bottom over the fragments of rock, which everywhere strew its bed, causing its waters to curl and rise in waves, which hurl the white spray on high, and give to the surface of the stream the appearance of a ruffled sea.

Broad and fertile valley there is none, but in its place are frowning hills rising high on either side from the water's edge, clothed, and that scantily, with tufts of grass and shrubs, while near their ragged crests are scattered dark groves of bristling pines, giving to the scene an air of stern and bold magnificence, which cannot fail to impress the traveller with an idea that some vast and more than usual agent has been the means of stamping the landscape with unwonted grandeurs.

The banks and bed of the river are thickly strewed with rolled and water-worn fragments of every size, from the pebble to the mass of many pounds in weight, and seemingly brought down from great distances, as many of them evidently belong to formations which do not occur in these lower parts.

Boulders of quartz of gypsum, hornblende and mica slates, porphyritic gneiss, sienite and sand stones, are heaped together in confusion along the river's course, while here and there above the stream are vast beds of the same rolled stones embedded in clay and debris. These are situated solely at the lower part of the valley, commencing a little above Rampore, and increasing in magnitude from thence downwards; they are chiefly, if not altogether, situated at those places where the river takes a rapid turn, and have evidently been thrown up or deposited in the back current or still waters of the deep floods, which must have brought down the sediment and stones of which they are composed. These vast deposits of alluvial matter are horizontal, or rather preserve the line of level of the river, and upon their wide and flattened surface the traveller is pleased to see a rich and smiling cultivation. These beds are sometimes far from each other, at other places they extend along both banks of the river, by the action of whose current they have evidently been severed. Upon such are the villages of Neert, Dutnuggur, Kaypoo, and many others on both banks built, and surrounded by a beautiful and luxuriant vegetation.

Rivers of the present day are known to accumulate and deposit large beds of sand and other debris in the eddies or back waters which they make when winding through rocks or strata of unequal hardness, but these deposits of the Sutledge are not the gradual accumulations of months and years, but from their massiveness and the enormous blocks or boulders which they contain, must evidently owe their origin to a larger body of water than is now supplied even in the rainy season; they must owe their origin to some vast and perhaps oft-repeated floods from the upper parts of the district, such as the sudden outpouring or bursting of some extensive lake, which has brought down and deposited vast fragments of rocks, whose true site is situated many miles from the deposits which now contain them, and which tower up for two and even four hundred feet above the river's present level.

To state here the causes from which these beds have sprung would be to anticipate, and we shall see as we travel onwards into Spiti, that a solution is presented in the appearances which that valley exhibits.

Towards evening, the clouds began to gather thick and heavily, and

thunder growled nearer and nearer, preceded by a gale of wind that nearly tore my tent away. The rain came drifting up the valley, and curiously, but very civilly, kept the opposite bank of the river to where I was encamped, shrouding the mountains from my sight as it passed along, without even giving me a sprinkling.

The harvest had commenced at Dutnuggur as also at Kotgurh, and the sickle was in the field. In some instances the reaper and the plough were at work on the same ground, the one preparing the soil for the second crop, almost as soon as the other could gather in the first one. The first crop here consists, as in all these lower parts, of barley, wheat, poppies, and some minor grains, which are ripe in the months of May and June, when the fields are again made ready and sown with the autumn crop.

On the morning of the 21st, I resumed my pilgrimage by a good broad road along the left bank of the river, and a walk of nine miles brought me to Rampore, the capital of Bussaher.

After leaving Dutnuggur, there is scarcely any cultivation on the left bank of the Sutledge, owing to the rocks rising more abruptly from the stream, between which and their own base there is sometimes little more breadth than what is occupied by the road; at Rampore, although the town stands upon a broad flat at a turn of the river, there is no cultivation, except a few gardens in which the burgut again appears.

This place is therefore strictly speaking a manufacturing town, where those of its inhabitants who are not engaged in travelling with grain into Ludak and Chinese Tartary, are employed in the manufacture of pushmeena chuddurs, which are made from the under wool of the Tartar goats, called by the people "pushm" whence the word "pushmeena". These chudders or shawls are sold according to their quality and texture at from fourteen to twenty-five rupees each.

Rampore is also the winter residence of the Rajah, and is selected on account of the mildness of its climate at that season. To avoid the great heat which it experiences in summer, he usually repairs with his court to Sarahun, which from its greater elevation is free from such intense heat as is felt at Rampore, whose elevation is only 3,400 feet above the sea, while Sarahun is rather more than 7,000 feet, or about the height of Simla.

It is here that in the beginning of November the great fair is held, which draws together the people from the upper hills to barter the produce of those elevated tracts for that of the lower hills and plains. Here may be seen commingled in one grotesque assemblage the Tar-

tars of Hungrung, of Spiti, of Ludak and Chinese Tartary, with the inhabitants of Kunawur, of the lower hills and plains, and sometimes also with those of Europe.

Among these different tribes little or perhaps no money is exchanged, but the dealer in tobacco or grain offers to the seller of wool or woollen cloths an equivalent quantity of merchandise for that which he requires, and thus in a very short time the produce of either country or district has changed masters.

The greatest good humour and mirth prevails at this periodical "gathering of the clans," and few quarrels occur. Should two dealers however happen to fall out, or, as sometimes occurs, should the wine cup have been used too freely and broken heads ensue, the Rajah levies on the disturbers of the peace a fine according to the circumstances of the delinquents, which is paid in anything they may possess, whether money, sheep, or merchandise.

At this season the articles brought into the market from the upper hills, are blankets and sooklat from Lubrung, Khanum, Soongnum, and other places in upper Kunawur;—raisins, neozas, cummin seed, sheep, goats, and ghee from the lower parts;—chowrees, birmore, pushm wool, byangee wool, silver and gold dust in small quantities, borax and salt, numdahs, &c., from Ludak and different parts of Tartary.

These are exchanged for opium, celestial barley and wheat, tobacco, iron, butter, ghee, treacle or ghoor, linen cloths, brass pots, &c. all of which meet with a ready and profitable sale in the upper parts of the country.

Within the last three or four years, the traders from Ludak have purchased opium, which they did not take previously. Ghee is not purchased for Ludak or Tartary, but butter is taken instead, and forms a great ingredient in the mess, which they make of tea and flour, and which forms their food, as the chupattee or bannock does that of the low country people. It is purchased at Rampore at about eight seers for the rupee, and sells again in Tartary at four and five seers, so that cent per cent is no uncommon profit on this one article. Tobacco is also in great demand, and always brings a good profit to the trader.

Of the different articles manufactured in the upper parts, I shall again have occasion to revert in speaking of the several places where they are made, and I shall therefore pass on to the Rajah and his court, ere I take leave of the capital, and plunge into the woods and forests of Runawur. The Rajah is an ugly, common looking fellow, of about thirty years of age, and is of the Chuttree caste of Hindoos.

He is married, but has no legitimate offspring to succeed him, although he has a son and a daughter by some mistress or frail damsel, who doubtless, like a highland lassie of the olden time, would have thought it a crime to refuse the laird anything in her power to bestow. Should he die and leave no legitimate heir to succeed him, his territories will fall to the British Government.

He has three chief vuzeers who manage the affairs of his territories, and who in time of war would take command of his forces, as it is contrary to the custom of the country for the Rajah to do so in person. These three are equal in rank, and their office is hereditary.

Below them are several inferior officers also called vuzeers, whose office is not hereditary, but who are elected or rather nominated by the Rajah annually, and they seem to be thannadars of different pergunnahs; among this class is Puttee Kaur, Dr. Gerard's friend, who has lately been appointed vuzeer of Hungrung. The personal attendants or immediate household of the Rajah, consists of two sets of men called Churriahs, and Hazrees.

The Churriah derives his name from part of his duty being to carry the Churree, or silver stick, on occasions of ceremony before the Rajah. His duties are chiefly those of a Chupprassee, and he is sent into different pergunnahs to collect the revenue, to report any misconduct, and to see that the people are equitably assessed, that is, to point out who may be taxed more heavily, and who should be excused,—and in fact, to ferret out and report to the Rajah the conduct and circumstances of all his subjects.

Those who are smart, and acquit themselves to the satisfaction of their chief in this system of espionage, are usually high in favour, and receive occasional substantial presents in token of his approbation, while those who are lukewarm, lazy, or who are wanting in tact, get nothing but their trouble, for the Rajah gives no pay to his servants, their services on the contrary being compulsory.

The Churriahs form a body of from sixty to eighty men, never exceeding the one or falling short of the other number; they have three officers who, in the language of the country, are called "Pulsur," "Buttoonggee," and "Naigee," answering to Soobadar, Jemedar, and Burkundauze. They are exempt from military service, and remain with the Rajah. They are drawn from the district of Kunawur, and are compelled to obey summons, unless it graciously pleases his Highness to excuse them, in which case however he takes good care to exact a fine for their non-attendance.

Some wisdom is shown in the selection of this body, as none are

taken but men in easy circumstances, who possess either lands or flocks, the Rajah rightly thinking that those who are well off, will be more likely to keep a sharp eye on the discontented or troublesome characters, than those who have all to gain, and nothing to lose. He has also the satisfaction of reflecting that in case of misconduct they possess the means of paying a heavy fine.

The Hazrees are a larger body of men than the Churriahs, and they sometimes perform the same duties, but in general they act as Chowkeydars or guards to the Rajah, being distributed round his camp or his palace by night, in a chain of sentries. They consist of one hundred and forty men, and have one officer called a "Gooldar"

Of their number, however, no more than forty or fifty of the smartest are required to be in attendance; the others are suffered to remain at home. They are fighting men, and in time of war would join the forces.

There is no standing army or any regular soldiery since the British Government extended its protection to Bussaher, and even before that time it resembled an half-armed mob, rather than a military force, having no uniform, and each man being armed according to circumstances, some with matchlocks, some with swords, and others who possessed neither, arming themselves with sticks and branches of trees.

This rabble was commanded by the three vuzeers if the enemy was in force, or by two or one according to the exigency or trifling nature of the disturbance.

The Rajah pays a tribute of 15,000 rupees annually to the British Government, which is levied in coin on the inhabitants according to their circumstances, some paying two annas, others four annas, and onwards to ten rupees, which is not exceeded except by the three vuzeers who pay twelve rupees each annually.

The amount of private revenue which the Rajah himself derives from Bussaher is very uncertain, and cannot be fully ascertained as it is paid in kind, consisting of lambs and kids, blankets, and other manufactures, wool, neozas, raisins, and rice from Chooara, across the Burenda pass, which is I believe the only grain he receives. If the season be bad and the flocks are sickly, or the young ones die, that portion of the revenue is excused for that year, and so likewise if the fruits or crops fail, so that his revenue varies according to the goodness or unfavourableness of the seasons. It may perhaps be roughly computed at from fifty to fifty-five thousand rupees annually.

For crimes and misdemeanours, fines are levied according to the

nature of the offence and the circumstances of the offending parties, these fines though nominally amounting to a certain number of rupees are always levied in goods.

Thus when the village of Junggee in Kunawur neglected to furnish me with coolies to carry my baggage, the Rajah ordered a fine of one hundred rupees to be levied on the inhabitants, which was to be realised in anything they had to give. The same punishment would have been inflicted on the Churriah who accompanied me to Spiti, had he refused to go. When the Rajah ordered him to prepare for the journey, he was on his way to Simla, to be present at his master's interview with the Governor General, and having already been in Spiti he felt no desire to return to it, consequently he declined going, and offered to pay a fine of five rupees if the Rajah would excuse him and appoint somebody else; but the Rajah turning to him said,—No, no, if you disobey my orders I shall not ask for five rupees, but make you pay one hundred. This was enough, for bad as was the prospect of a journey into the dreary district of Spiti, far worse for the Churriah would have been the infliction of such a fine, and he therefore departed without another word.

From Rampore to Gowra, the next stage is a long and fatiguing ascent all the way. The road winds up the side of a very steep hill, and is strewed with blocks of stone, so thickly in some places as to resemble the bed of a torrent rather than the high road between the Rajah's summer and winter residence.

The first part of the ascent is over a nearly bare hill, but the scenery improves farther on, and the way is cheered by the occurrence of a scattered forest of oaks, mulberries, rhododendron, and the "Pinus excelsa" or Cheel. From the crest of the ascent, a pretty view is obtained of the surrounding country; a small amphitheatre is spread beneath, the foreground consisting of gradually sloping hills shelving away towards the river, which winds along unseen below. This slope was studded over with the bright hue of the ripening crops, while round them rose thickly wooded hills, backed in their turn by the dazzling splendour of the snowy range.

From the brow of this hill the road dips suddenly down again into a thickly wooded dell, from whence it rises on the opposite side to the village of Gowra. Thinking to avoid this second ascent, I followed a bye path through the forest, and a precious scramble I had of it. The soil was so thoroughly impregnated with decomposing chlorite, that it was with some difficulty I could manage to keep upon my feet, from the greasy saponaceous nature of the rock; and when at last I

reached the stream at the bottom of the glen, from which the road again ascended, I found that the pugdundee I had chosen to follow led along the side of a hill which was daily yielding to the weather, and falling down in masses, which left a nearly perpendicular mural cliff to scramble up. Hands and knees were in some places necessary in order to avoid slipping back again, and this by the greatest exertion. We passed over some masses which the weather had detached, and which were actually tottering to their fall, and were hanging almost by nothing over the deep glen below. On my return to this place, two months and a half afterwards, in the rains, these masses had all been hurled down, and their fragments were scattered in the bed of the stream ; yet another pathway had been made by the villagers to save a mile or two, and it is doubtless doomed, like its predecessors, to fall at no distance of time into the glen. This time I preferred the steepness of the road, to the wet and slippery pugdundee. We managed however to get over safe enough, and my people gave me Job's comfort, by telling me there were far worse roads ahead! Save me, thought I from bye paths in future, and I felt by no means inclined to exclaim with the courtier in Bombastes, "Short cut or long, to me is all the same!"

Gowra is a small village, and contains but few houses. It is situated far above the Sutledge, which winds along unseen in the depths below, and the hoarse roar of its turbid waters is even scarcely heard. Here were apples, apricots, mulberries, and citrons bearing fruit, and the barley was nearly all carried from the fields.

In the woods around the village plenty of game is found, such as the monal, college pheasant, black partridge, and chikore. At this place I halted on the 22nd of May, and the next morning after a walk of an hour and a half arrived at a small village called Mujowlee, where I again encamped, as the rest of the way to Sarahun, which is the proper march, was all up hill, and had I attempted it, my baggage and tent would not have arrived until night, and I should have got no dinner into the bargain, which to a traveller in such a country is by no means either pleasant or comfortable. The road from Gowra to Mujowlee is very good indeed, and vies in some places with those of Simla ; it lies through very pretty woods of oak, firs, mulberry, and many others common to the lower hills ; the wild dog-rose with its snowy flowers, spreading over the tops of the underwood or climbing high into some tall oak, was in abundance, and almost every villager had a thick roll or necklace of the flowers hung round his neck, or stuck in a bunch on one side of his bonnet.

From Mujowlee we descended into a steep khud or glen, at the bottom of which by a frail and ricketty sangho of twigs, which is continually carried away by the rise of the waters, we crossed a stream which runs down and joins the Sutledge about a mile or two lower. From this we toiled up a long and steep ascent on the side of a hill, very prettily wooded with oaks, firs, horse chesnuts, walnuts, peaches, apricots and bukkines, intermingled with the raspberry, blackberry, and white dog-rose. The number of fine mulberry trees which for the last few marches had every where occurred near villages, led me to inquire if the silk-worm was known to the people, and if so, why they did not import and cultivate it. Such an insect it seemed had been heard of, but nobody appeared to know what it was like, nor had any one ever thought of introducing it to the hills; and the reply was, "We are hill people, what do we know of silk-worms?"

Nevertheless I see no reason why the insect should not thrive well in these villages along the Sutledge, where the summer enjoys a warmth unknown to Europe, and where the winter is certainly not so severe as in our native land. Food for the insect is in abundance, and is at present useless. At Simla, in the summer of 1837, I saw many caterpillars of a species of silk-worm feeding on a mulberry tree, in a garden there, which shows that very little care would cause it to become an useful article of trade in the lower hills. It is indeed very probable that the insect does already occur in the places I have alluded to, although it is at present unknown to the inhabitants, who are too busily employed in the cultivation of their fields to bestow a thought on "Entomology!"

Were the insect introduced, and the people instructed in its management, which could be easily done by sending skilful hands from the plains, I have no doubt, from conversations which I held with them on the subject, that they would gladly give their attention to its cultivation; but the introduction of it must be made by those who are in some authority, as the people themselves are far too poor to run the risk of expense which any experiment might entail upon them.

After gaining the summit of the ascent from Mujowlee we leave the pergunnah of Dussow, and drop over the frontier ridge of the district of Kunawur, arriving by a short and gradual descent at the town of Sarahun.

This is the usual summer residence of the Bussaher Rajah, who flies from the heat of his capital in the month of May, and returns again in time for the annual fair of November.

The elevation of Sarahun is about 7,300 feet above the sea, and it

is situated in a beautifully wooded recess or amphitheatre formed by the hills advancing round it in a semicircle behind; while in front they slope down in the direction of the Sutledge, from which again on the opposite bank rise the dark and usually barren hills of Kooloo.

The heights all round were in the month of May still deeply covered with snow, which however does not remain, but melts away as the rainy season sets in.

The village of Sarahun, for it cannot be called a town, has a shabby and ruinous appearance, and except at the season when the Rajah honors it with his presence, is nearly deserted. It boasts of no manufactures. At the time of my arrival the Rajah had gone to Simla to wait upon the Governor General, and having on this occasion drawn around him his retainers, the place was left with scarcely an inhabitant, except a few old women and children.

Journeying onwards from Sarahun, the road was at first tolerably level and easy, but after a mile or two it changed to a steep ascent over stones of all sizes, and sometimes overhanging the khud at places where the weight of snows had caused the whole to slip down, and where a plank or the trunk of a tree had been thrown across the gap to supply the deficiency.

The whole way was however very pretty and well wooded, and we crossed two or three streams which came rushing down from the snows on the heights, to join the Sutledge below us. One of these streams at eleven A. M. had a temperature of 45°, while the air at the same time was at 89°. From the ridge of the hill we descended for some way through a beautiful forest, in which at last, after a walk of eight good miles, we encamped at noon, surrounded by oaks, rhododendra, walnuts, horse chesnuts, apricots and mulberries; many of the horse chesnuts were magnificent trees, and covered with their conical bunches of flowers, which with the scarlet blossoms of the rhododendron arboreum, gave a pleasing effect to the surrounding scenery. In one part of the forest we found vast beds of a large flag iris in full bloom, and quite distinct from the small species which I saw on my way to the Burrenda pass in 1836. It is not perhaps generally known that the fruit of the horse chesnut produces a beautiful and permanent dye, and as it may be procured in some abundance in the hills, the following recipe, taken from the Saturday Magazine, may not be unacceptable to those who residing in the hills, may wish to avail themselves of the produce of the country.

"The whole fruit of the horse chesnut cut in pieces when about the size of a small gooseberry, and steeped in cold soft water, with as much

soap as will tinge the water of a whitish colour, produces a dye like anotta; the husks only, in the same manner with cold water and soap, produce a dye more or less bright according to the age of the husk. Both are permanent and will dye silk or cotton, as much of the liquor as will run clear being poured off when sufficiently dark."

During the past night at Sarahun we experienced some heavy showers of rain, accompanied by thunder and lightning which cooled the air, and gave us a delightful day to travel in. Many of the heights which before had begun to look black from the melting of the snows, were now again completely covered with a sheet of dazzling whiteness. The day continued cloudy with some heavy showers in the afternoon, and snow appeared to be falling heavily over all the neighbouring peaks.

Several flocks of sheep and goats passed our encampment during the day, on their way from Rampore to the upper parts of Kunawur; each animal was laden with flour, which is carried in small bags thrown across their backs and confined there by a crupper and band across the chest, with another under the belly, answering the purpose of a girth. Each carries according to its strength from six to twenty seers* in weight, and they form the chief beasts of burthen throughout the country, travelling ten and twelve miles daily with ease and safety over rocky parts where mules and horses could not obtain a footing.

From this encampment we continued our march, still through the forest, to the village of Tranda; the road in many places was very precipitous and rocky, and numerous rudely constructed flights of steps occurred at those places where the ascent was too abrupt and rocky to cut a road. Before climbing the last steep hill to Tranda we came to a deep glen, with a roaring torrent hurling itself along towards the Sutledge with headlong fury; over this had once been a goodly sangho bridge, composed of three trees thrown across from rock to rock, with planks of wood nailed transversely across them, but the weight of the winter snows had thrown the bridge all on one side with an awkward slope to the gulph below, and had torn half the planks away, leaving wide intervals at which there was nothing left to walk on but the round trunk of a single tree; and the dazzling foam of the waters seen beneath as the torrent rushed along, imparted to the passenger the feeling, that the crazy bridge was gliding from beneath his feet, and made it dangerous to attempt the passage. Two only of my people crossed it, and they were laughed at for their folly.

* A seer is 2 lbs.

A flock of sheep arriving while we were deliberating on the best method of crossing the stream, decided our plans at once. It was impossible for even these sure footed animals, laden as they were, to cross in safety, at least their owners would not run the risk; and in a short time therefore young trees were felled and placed across a narrower part of the stream, and covered over with bundles of twigs laid on transversely. Over this the sheep led the way unhesitatingly, and we followed in their wake. From this we climbed the ghat to Tranda, where I encamped amidst a forest of majestic Kaloo pines. From Tranda I proceeded to Nachar, a pretty walk of about eight miles, some parts being steep and rugged. The road at first ascended for a short distance, and then turning round the hill brought us to a steep descent, down which it fell somewhat abruptly in a zigzag manner to the bottom of a wooded glen. In many parts it wound backwards and forwards so suddenly, from the steepness of the hill, that on looking upwards it was no pleasant object to behold the long train of my baggage coolies slowly winding downwards in a zigzag line above my head, and while thus standing below the crazy looking scaffolding, which in many places formed the road, I could not help thinking to myself, "If those fellows with their loads should chance to come tumbling through, how terribly they would spoil the crown of a certain gentleman's hat,"—and the feeling made me hasten on to avoid the fancied, but not improbable danger.

Nachar is a small village situated at some height above the Sutledge, on the slope of the left bank. The thick forests and rocky glens from this place downwards to Sarahun, may be deemed the head quarters of the *Gooral* and *Thar* antelopes, the latter being known here by the name of "*Eimoo.*" Thèr, and black and red bears are also met with, the first and last inhabiting the higher and colder portions of the range.

Bears are not found generally throughout Kunawur until the season when the grasses are ripening, and it then becomes a matter of great difficulty to prevent the vineyards being robbed at night.

Large dogs and men at this season keep nightly watch, making a continued shouting and firing of matchlocks to keep off the invader. They also commit sad havoc in the autumn crop of phuppra. At other times they are said to retire to the higher parts of the forests, where they lie concealed among the deep caves of the rocks, feeding on various roots and acorns. The Thibet bear is abundant on the heights above Nachar, as also the red variety. Here they are both said to attack and kill sheep and goats, and they are often such a

nuisance that it is considered a feather in a man's cap to shoot one. The elder brother of the Churria who accompanied me to Spiti had killed no less than fifteen bears, and was looked upon as a Nimrod in consequence.

The red variety is said to differ in nothing from the common black or Thibet species, except that it is red while the other is black. Both are said to possess the white band across the breast, but that it is constant in neither. I strongly suspect that subsequent research will prove that there are at least *two* if not *three* distinct species in these hills, namely, the Thibet bear, the red bear, and another black species without the white crescent on the breast, of smaller size and greater ferocity.

The natives say, both black and red live together in the same haunts, and that when both come down to feed at night in the vallies, the red one does not always return to the heights, but remains in the lower haunts of the black bear. If this statement be correct it would argue a greater difference in the species than that of colour, for why should climate act on some and not on all, since all are in turn found equally near the snows. If colour were the only difference, then the red one by staying in the haunts of the black bear would resume his former colour, and the black one by going to the heights would become red; but as this is said not to be the case, and that both black and red can reside together either high or low, it goes far to prove a specific distinction; the red bear is however found chiefly near the summits of the ridges, while the black one inhabits the lower and more wooded tracts in the thick forests of oak, where they feed upon the acorns and other fruits. Both species in the autumn make nightly incursions into the fields of phuppra, which they destroy in quantities, and they also in the summer approach the villages and steal the apricots.

In the winter time when food is scarce they are said to tear down the wooden hives, which are built into the walls of the houses, and to devour the honey, nor is this the extent of their plundering, for they have been known to force open the door of the sheep house, and run away with the fattest of the flock. A lad who accompanied me, hearing the questions I asked regarding these animals, very gravely declared that when the bee-hives were too high to be reached from the ground, the bears went to the forest and brought a long pole, which they planted against the wall and used as a ladder! We all laughed at this thumping fib, which was evidently made for the occasion, but he only persisted in it the more, and at last swore that he had seen them do so!!

Some are said to store their dens with grass and herbs, in which they keep themselves warm during the prevalence of the snows; others select the hollow trunk of some large decaying tree in which they form a similar warm bed. This however I look upon as a fable. There are not many about Cheenee and Punggee, and above those places they are not founded; the greatest numbers therefore inhabit the lower parts of Kunawur.

During the winter in those parts where the Emoo, the Gooral, and the Thér are found, it is the custom when the snow has fallen somewhat deeply, so that the animals cannot avail themselves of their natural speed, for parties of eight and ten men to assemble with their matchlocks and sally forth to the chace, guarding their legs from the snow by two pairs of woollen trowsers, and a warm thick pair of woollen shoes. He who is lucky enough to get first shot at the quarry is entitled by the rules of the Kunawur sporting clubs, provided he has fired with effect, to the skin of the animal, and the rest of the party share equally of the flesh, whether they have had a shot or not. The skin is the most valuable part of the prize, and out of it many useful articles are made, such as soles for their shoes, bags to carry grain and flour, and belts, &c. so that to get the first shot at the game is not only as much a point of honour as getting the brush in a fox hunt at home, but is also a source of profit to the lucky sportsman.

The bear is not held in much dread by the people of Kunawur, for in the season when they have young ones parties go forth to the chace with a few dogs and armed only with heavy *sticks*. When a bear with cubs is unkennelled by the dogs she at first makes off in great alarm, but as the dogs soon overtake and keep the cubs at bay until the huntsmen come up, she retraces her steps and wages war in defence of her young. Some skill and agility are now required by the hunters to avoid a hug, and at the same time to administer some weighty blows over the animal's head and snout, until having received a hearty cudgelling from the party, she once more makes off after her cubs, who have profited by the delay to get well ahead. The dogs however again overtake them, and again and again the poor mother returns to defend them, and receives a thrashing, until tired and exhausted she secures her own escape and leaves her offspring in the hunter's hands. Bears and leopards are somtimes killed by constructing an immense bow, charged with one or more arrows. A bait is placed to entice the animals, and connected with the bow string in such a manner that when seized the arrows are discharged into the animal's body, and with such force as often to pierce

it through and through. The skins are cured and sold at a rupee and two rupees each to the Tartars and Lamas, who take them to the upper districts and dispose of them at a profit, or make them into shoes, &c; opposite to Nachar, on the Kooloo side, the wild dog is also said to be abundant, but so difficult is it to get a sight of the animal that the natives never go in quest of it, and indeed they have such a fear of it that even if they found one, they would not fire, as they say if only wounded the whole pack turn upon the hunter and destroy him. In this there is doubtless much exaggeration, but nevertheless the idea, however erroneous, is sufficient to deter the shikarre from the chace. These dogs are also found in the forests of Chooara, where, hunting in packs, they destroy deer and other game; even the leopard and the bear are said to fly before them, and will not remain in the same jungles. They also attack the flocks, and commit great havoc. I heard of an instance where a shepherd lay in wait for their coming, armed with a matchlock, with which, from the shelter of his hut, he intended to shoot or scare them away from his fold, which they had on a former night attacked. Alas, however, for the weakness of human resolves, no sooner did the pack arrive than the shepherd's courage vanished, and like that of Bob Acres in the Rivals, fairly oozed out at the palms of his hands, and he was afraid to fire; for said he, very prudently, "Who knows if I only wound one but that they may pull down my house and attack me; no, no, let them eat their mutton in peace;" and so in truth they did, for the next morning the coward found twenty-five sheep killed and mangled by his midnight visitors. This animal is also said to exist in Chinese Tartary, and is called "Chungkoo."

It is in the forests of these lower hills, that the various beautiful species of the pheasant tribe are found, and none but the Chikore and gigantic partridge are seen in the upper portions of Kunawur.

On the 28th of May I left Nachar and travelled for a mile or two over a capital road, descending to the Sutledge, which I crossed by the Wangtoo bridge. This although dignified with the name of a bridge, is in truth no more than a good broad sangho; it is constructed entirely of wood, and consists of three or more long trunks of trees thrown across the river, the ends resting on buttresses of stone masonry, and supported by three rows of projecting beams or slanting piles. On these buttresses stand two covered gateways through which the bridge is entered on from either side; across the trees, are nailed planks of wood, and the sides were formerly protected by a slight railing, though it has now almost entirely disappeared.

The space of the sangho is the breadth of the river, or eighty feet, and its height from the water, which I measured with a plummet, was fifty-seven feet.

In former years before the invasion of Kunawur by the Goorkhas, a good bridge existed here, but it was broken down by the inhabitants of the districts, to cut off the communication across the river and check the advance of the enemy. It was never afterwards rebuilt, until the time of Capt. Kennedy, when the present sangho was thrown across.

According to accounts received from the natives, the present bridge was built by them, and Captain Kennedy on the part of Government furnished the means, to the amount of two thousand rupees. Others say that it was built at the suggestion of Capt. P. Gerard, when stationed as commercial agent at Kotgurh, with the view of facilitating the communication with Chinese Tartary and the upper portions of Kunawur, as the fleece of the Choomoortee sheep, called byangee wool, was then in demand, and purchased for the British Government.

The glen is at this point very narrow, and confined by the dark rocks of gneiss rising up abruptly on either side, and affording merely space sufficient for the bed of the river. Beneath the bridge the river rushes like a sluice, and has such a deafening roar that the voice of a person speaking on it is scarcely heard. From this, a short quarter of a mile brought us to the Wungur river, which runs down from the Kooloo side to join the Sutledge a little above the Wangtoo bridge; we crossed its stream by another sangho, and then addressed ourselves to climb the hill, which rose above us to the height of 2000 feet.

Up this ascent we toiled in a temperature of 98° over a road strewed thickly with the sharp cutting fragments of gneiss and granite, and wearied with the heat and fatigue of climbing in a midday sun. We felt vexed and disheartened on arriving at the top, to find that our labour had been all in vain, for on the opposite side of the hill the road again dipped down to the very edge of the Sutledge, while far away in the distance we could see a second long ascent to be travelled up ere we could find shelter and refreshment at the village of Churgong. The heat and length of this day's march were very painful, as the road often lay along the very brink of the river, the glare from whose waters was almost insufferable, which added to the fatigue of walking, or rather scrambling over the rocks and stones that were strewed along the banks, and the hoarse incessant roar of the foaming stream, completely fagged us all, and it was late in the evening ere my tent and baggage made their appearance.

Scarcely had we arrived at the end of the march, when to add to our discomfort a heavy thunder storm suddenly broke over us, obliging us to seek shelter where we could, and soaking my bed and other things which were still far in the rear. In the evening I witnessed one of the most beautiful rainbows I had ever beheld ; the sun was just dipping to the ridges of the hills, and shining on the vapoury clouds that were floating up the valley, caused the bright colours of the rainbow to stand forth most brilliantly, one end resting on the river's brink while the wide arch was thrown across the valley and was lost beyond the snow-clad summits of the other bank.

It was nearly opposite to this village, on the left bank of the Sutledge, that the conflict took place between the Goorkhas and Kunawurrees, in which the advanced guard of the former experienced so warm a reception as to make them glad to come to terms, and a treaty was accordingly entered into, stipulating that so long as the Goorkhas refrained from entering Kunawur, a yearly tribute should be paid to them. This treaty, I believe, was never infringed, and remained in force until the expulsion of the Goorkhas from these hills by the British forces.

My people were so tired with the long march from Nachar, that they begged hard for a halt at this place : as I was anxious to push on however, and the next stage was said to be a short one, I did not comply with the request, and accordingly proceeded on the morrow to the village of Meeroo.

Nearly the whole way was up hill, and in some places steep and rugged, but it got better by degrees, until entering a forest of prickly leafed oaks it became very good and continued so, although still up hill, to the end of the march. The heat and consequent fatigue of climbing steep hills under a burning sun were almost intolerable, and I wished many a time that we were among the snows which capped the range along whose sides we were toiling. Few things are more calculated to strike the naturalist, in wandering through the grand and beautiful scenery of these stupendous hills, than the almost total absence of living creatures ; days and days he may travel on, through woods that seem to promise shelter for every various form, so diversified are the trees and plants which they produce ; yet, save the crow, or the swallow as it skims along the open grassy tracts, scarcely a living thing is met with ; all seem to shun the intermediate heights ; and while the bear and leopard, deer, and goats, flock to the higher ridges near the snow, the various species of the feathered race cling to the lower woody tracts, where sheltered and secure they rear their

young. At Meeroo the temple was adorned with about twenty pairs of horns of the sikeen and wild sheep; the former animal is an ibex, and is said to have been once plentiful here among the snows, but of late years it has entirely disappeared from the neighbourhood. Some of the horns on the temple are of large size and were placed there by the fathers and grandfathers of the present generation, none of whom recollect seeing the living animal near the village, although there are some old men among them too. I inquired if I might take some of the horns, to which they replied with feigned astonishment, "they are presented to Devi, and who will dare to rob her temple?" I disclaimed, of course, all intention of *robbing her*, but suggested that as she had now possessed the horns for some time, she might perhaps be willing to take something else *in exchange!* To this they said, she could have no objection; and after a little bye play among themselves, a hoary headed old sinner stepped forward and informed me that "the devil was willing to sell his horns at two rupees a pair!" I agreed to give it, but on examination it was found that the whole batch of them were worth nothing, being quite rotten and decayed from age and exposure to the elements, so I declined taking them. The wild sheep is still occasionally found on the heights above the village, and sometimes also a stray *jahgee*, or horned pheasant. I had made repeated inquiries regarding the actual existence of an unicorn in any part of the hills, but although I found many who had heard of such an animal, and believed in its existence, I could meet with no one who had ever seen it.

Here however I encountered an old man who had travelled much in the interior, and various parts of the mountains, and who declared that he had once beheld the unicorn. I was of course all attention, and on the tiptoe of delight with the idea that I should now have an opportunity of describing this long considered fabulous animal, and of ending discussion past, present, and future, as to its existence. Alas, my visions were doomed to fleet away, for after a long and close examination, in which it was necessary to listen to a rigmarole history of the old man's birth, parentage, and education, and his never ending travels into Tartary to purchase wool, which he had done regularly every summer of his life for forty years, it turned out to be nothing more than an ugly clumsy rhinoceros which he had seen in the possession of the Rajah of Gurwhal, and which he described as being like an elephant without a trunk, and having a horn on its nose.

From Meeroo we had an up hill march all the way, and crossed the first snow at a stream over which it formed an arch, so hard and solid

that it did not yield to the tread, though the sun at 10 A. M. was shining on it at a temperature of 82°, while the stream beneath was as low as 38°.

From this spot commenced a long ascent over the side of a grassy hill, strewed with sweet smelling violets and the little scarlet "pheasant's eye," and near the summit of which we encamped, being about three miles from Rogee, which is the usual stage, but being situated off the road at half a mile down the Khud, I preferred staying where I was for the night. From this place we had a good view of the Burrenda Pass which was indeed apparently only separated from us by the deep glen through which the Sutledge flows; it was still thickly covered with snow, and looked like a deep notch cut in the snowy range. The hill above our encampment was also heavily covered with snow, from which throughout the day, immense beds or avalanches, loosened by the heat of the sun, were constantly precipitated into the glen below, or falling from rock to rock with a heavy and deadened roar like distant thunder, and resembling in their course some mighty cataract. Towards evening as the sun dipped behind the range and the first chills of night were coming on, these sounds gradually died away, and the snow became once more bound up by frost. The height of my camp here was 9,897 feet, and the little lagomys and the chough were now first seen among the rocks that overhung us; here too, I once more found the purple iris, discovered in my trip to the Burrenda pass, but it had not yet put forth a single bud. On the 31st of May I continued my march towards Chini, by a good road that continued to ascend for some distance, and at length brought us to an elevation where many beautiful plants of iris were in full bloom; it was the same as that found at my last encampment, and among them was a single root bearing a pure white flower, showing modestly among the deep purple of the neighbouring plants, like a fair bride surrounded by the gay and glad attire of the bridal train.

A little farther up the ascent, at about 10,500 feet, I took some splendid specimens of a new species of *peepa*, the largest of that genus I have yet seen belonging to our Presidency. They were adhering by a thin viscous plate to the stalk of a coarse grass, growing at the roots of juniper and a species of furze bush, the latter beautifully covered with yellow flowers. The species being new to science, I have given it the name of "*Peepa kunawurensis*," from the district in which I obtained it. Here too the rhubarb was growing abundantly, and as I had now tasted no vegetables for many days, I gathered some of the stalk and had an excellent stew for my dinner.

About three miles from Chini we came to a place where the whole hill-side had slipped away into the Sutledge, forming a mural precipice of several thousand feet from its base to the summit. The rock was thus a prependicular cliff, and the road which leads along the face of it is a mere scaffolding, somewhat resembling that used by builders against the side of a house. Looking down from this exalted station the Sutledge is seen, narrowed by the distance to a stream, as it winds along below at the perpendicular depth of 4,000 feet. This though an awkward place to look at, and somewhat like walking in the gutter of a fourteen storied house in the "gude town o' auld Reekie," is nevertheless perfectly strong and safe, and almost capable of allowing two people to walk abreast, so that unless one wishes to look below into the yawning abyss, it may be passed over without having been once seen. That it is safe, may be gathered from the fact that flocks of sheep and goats laden with attah and grain, pass over it almost daily during the summer months, as also men; in fact it is the high road in every sense of the term between Rampore and Tartary.

Much has been said and written concerning the dangers of the way, but the road, taking it on an *average*, has hitherto been *excellent*, and though here and there, from stress of weather, it is at times a little broken and perilous, yet those places are so few, and continue for such short distances, that they cannot be allowed to characterise it, or to admit of its being called dangerous or even bad.

True enough it is, that one of these bad places may be the means of breaking a man's neck if he chance to slip, but the answer to that is, that he who cannot keep his feet, or who grows giddy at the sight of the depths below, has no business to travel over "bank and brae." The road is kept in repair by the zemindars of villages, by order of the Rajah, and much credit is, I think, due to them for the manner in which they perform the task; for with very little additional care to that which is now bestowed upon it, it might vie with any of those of the lower hills, and is even now superior to them in many parts.

There is no spot, in fact, even the worst, which a man ought to turn away from, and though I would not recommend a lady to try them, I can safely say, that I have crossed many a worse place in the khuds near Simla, while in search of objects of natural history. But after all, the difficulties of a road will be always estimated according to the imagination or temperament of the traveller; for he who is accustomed to mountain scenes, or to scramble over all places as they may occur, will laugh at that from which another man would turn away; habit is a great thing even here, and that which seems

dangerous at first, becomes nothing when one is accustomed to it. Thus it may happen that others shall follow in my path and laugh at that which I have called bad or dangerous.

The scenery from Meeroo to Chini is beautifully grand and imposing, the snowy range on the left bank being spread along the whole way like a fair white sheet, and raising its ragged outline far above all vegetation, till it attains, as in the bold giant peaks of the Ruldung group overhanging Chini, an elevation of twenty-two thousand feet above the sea.

The right bank of the river presents a marked contrast to this bold and awful grandeur, the hills receding more gradually and with a less shattered look, being thickly clothed to their very summits with noble forests of pines of many species, as the Kayloo, Neoza, Spun, and Cheel.

Chini, though a tolerable sized village for the hills, has a poor and ruinous appearance about it; it is situated in the midst of cultivation which is plentifully irrigated by streams from the snows above, which come dashing down in a sheet of foam as white as the snow beds from which they issue. Chini is rather the name applied to several small villages or hamlets scattered among the cultivation and resting on the slope of the right bank, than that of any one in particular. This is not uncommon in Kunawur, and occurs also at the next stage, where several are again comprehended under the one name of Punggee.

On the opposite side of the Sutledge, a few miles higher up its course than Chini, is situated the village of Pooaree, famous for producing the best kismish raisins in Kunawur. It is also the residence of one of the vuzeers, and has a *joola* of *yâk's* hair ropes over the river from which a road leads up to the Burrenda pass.

On the 1st June I proceeded to Punggee, where a number of my coolies whom I had brought from Simla became alarmed at the accounts they heard people give of the scarcity and dearness of provisions in Spiti, and refused to accompany me farther. Remonstrance and advice were alike thrown away upon them, and finding that neither promises nor threats had any effect, I gave the order to the Churriah to furnish me with the necessary number. On his announcing my order to them in the Kunawur language, a most amusing scene took place; men and women, old and young, threw themselves at once with such hearty good will upon my baggage, each scrambling for a load, that I fully expected to see half the things torn to pieces in the scuffle. After much noise and laughter each succeeded in obtaining something, and off they all trudged right merrily towards

Rarung with their burdens, joking to each other as they passed the astonished mutineers, who little expected to see me thus far from home so speedily supplied with carriage. In fact they had somewhat reckoned without their host, and thought that as I was so far advanced into the hills, they might safely dictate the terms on which they wished to be retained. Five of the number afterwards repented and followed me to the next stage, begging to be reinstated, which I granted, but fourteen others went back sulkily to Simla.

In Kunawur the women often carry quite as much as the men, and several of them marched along with apparent ease under burdens which the effeminate Simla coolies pronounced to be too heavy. One fine stout Kunawuree, whipped up in the scramble four bags of shot, amounting in weight to 56 seers, or 112 lbs, and carried them on his back the whole march, which is hilly and over the worst bye paths I ever saw, even in the hills. Two men had previously brought these same bags from Simla, and grumbled at the weight which was allotted to them, namely 28 seers each. The hardy Kunawuree demanded only two annas for his work, while the Simla men had refused to carry half the weight for three annas a day. While on this subject it may not be amiss to inquire why, since throughout Kunawur and all the neighbouring districts, the coolie demands but two annas per diem for his labour, those of Simla are allowed to refuse to take less than three? For two months and a half I had occasion to hire daily a number of these men at every stage; not one ever dreamed of asking more than a paolee, or two annas, nor was there hesitation and grumbling in lifting their allotted loads; each took his burden on his back and trudged merrily along with it to his journey's end. On returning to Kotgurh not a man would move under three annas, and all objected that the loads were too heavy, although the same had often been carried for long and fatiguing stages by the women of Kunawur. The weight allotted to each coolie is, by order, not to exceed thirty seers, but when was a coolie hired within the British rule, who did not hesitate and often refuse to carry twenty seers? They will come and lift the load, pronounce it too heavy, and walk off, and as far as I know, there is no redress for it, or at least I never heard of any one getting it. It is childish to fix a load at thirty seers and yet leave the coolies at liberty to reject half the weight if it so please them. The Kunawur coolie carries more, carries quicker, and demands less for his labour, than those within our rule; with whom the fault may lay, I do not presume to say, but it seems to me that a remedy for the evil might easily be found, by an order from

those in authority regulating the fare of a coolie to be two annas a day, marching or halting, and that any man plying as a coolie and refusing to lift a load not exceeding the regulated weight, shall be subject to punishment, or be turned out of the bazar, and not allowed to ply again. For the purpose of seeing these orders carried into effect, a coolie mate or police Chupprassee could be appointed from out of the many idle hangers on, of the Political Agent, and the coolies might be ticketed or licensed to ply. From Simla to Bhar, which is in reality but three marches, a greater imposition still exists, for no coolies will go either up or down under twelve annas, which is at the rate of four annas a day, and often the demand, when Simla is filling or people are returning to the plains, is one and even two rupees. In former days things were much better managed, for there are those still living in the hills who remember a coolie's hire to have been two annas marching, and one and a half halting. Now, however, every coolie talks of non-interference, and the rights of a British subject! and threatens you with his vakeel and a lawsuit, and many other combustibles besides.

There is perhaps no bazar in India where the European is more at the mercy of the native than in that of Simla, for there exists no Nerick of any kind, and I have heard it maintained by those in authority, "that a man may demand what he pleases for his labour or his goods;" which is in other words to say, that the native may be as exhorbitant as he pleases, and the European must pay the piper!

No one can more warmly advocate the strict administration of justice between man and man, than I do, whatever be his colour, whatever be his situation in life; but it appears to me by no means either just or necessary to uphold the native on all occasions, or to consider the European as always in fault. Such a system tends materially to lower the dignity of the British character without in the least increasing the popularity of him who adopts it, for the shrewd native is ever willing to join with the European in the cry, "'Tis a very bad bird that befouls its own nest!"

But to return,—"The high road across the ghats from Punggee to Leepee being impassable from the depth of snow in which it was buried, I was obliged to change my route and proceed by a lower and more circuitous road to Rarung. On leaving the main road, we followed a bye-path which dipped so suddenly and abruptly down the glen that it was with the greatest difficulty we could keep from sliding down the slope, so slippery was the ground from moisture and from the pine leaves strewed around. In some places indeed a single false step, or a

fall on the back, would have sent the unfortunate flying down into the foaming torrent below, at a rate as rapid as that of a slider on a "Russian mountain." We managed however, with much care and fatigue, to get slowly and safely to the bottom, where we crossed the river (which was furnished by the snows above) on a broken sangho, formed merely of four spars laid close together, and rendered slippery by the spray which was continually dashing over it. From this we again ascended by a road, not many shades better than the one by which we had just come down, and it continued thus the whole way to Rarung.

We had also to cross many smaller snow streams, which being without sangho or stepping stones, obliged us *nolens volens* to walk through them, sometimes nearly up to the knee in water, at a temperature of 38°, or only 6 degrees above the freezing point! It was indeed anything but agreeable, for we felt as if our legs were being cut off, and I vowed *coute qui coute* to cross the ghats on my return, whether they were blocked with snow or not. The forest all along this march was composed of Kayloo and Neoza pines. These names are only applied by the inhabitants of the lower hills and plains, the trees being known in Kunawur as the "Kelmung," and the "Kee," and the fruit or edible seed of the latter is alone called "Neoza."

From Rarung we had rather a better road than yesterday, but still bad, being chiefly over sharp blocks of granite and gneiss. This day we encamped at Jung-gee, and again proceeded on the morning of the 4th of June towards Leepee. The hills on the road from Punggee to Leepee have a shattered and decomposing aspect, vast masses being annually brought down by the action of the frost and snow, leaving in some parts high mural cliffs rising perpendicularly above the path to eight hundred and a thousand feet, while at their base is stretched a wide field of disjointed fragments of every size mixed up with beds of sand, decomposing mica slates, and felspar. These slope more or less gradually down to the river's edge, often at two and three thousand feet lower than the base of the cliffs. If a snow stream happens to descend near these accumulations, its waters are turned upon them by artificial drains, and in a few short months the former barren waste is seen to smile with young vineyards and rich crops of barley. But if, on the other hand, as too often happens, there is no stream near, the sands are left barren and dry along the river's course, sometimes increasing from fresh supplies from above, at others partially swept away by the force of the river when swollen by the melting snows in June and July. In the descent of these falling masses

whole acres are sometimes ploughed up, and the trees of the forest are crushed or uprooted by the rocky avalanche, more completely than if the axe had cleared the way for cultivation. This devastation is chiefly caused by the alternations of heat and frost ;—the power of the sun during the day acting on the beds of snow, causes innumerable streams to percolate through the cracks and crevices of the rocks and earth, which being frozen again during the frosts of night, cause by expansion the splitting of the granite into blocks, which being loosened by the heat of the following day from the earth which had tended to support them, come thundering down with fearful rapidity and irresistible weight through the forests which clothe the mountain's sides. After proceeding somewhat more than half way to Leepee, my guide, whose thoughts were " wool gathering," very wisely took the wrong road, and led me down a steep glen, at the bottom of which had once been a sangho across the stream, and the road from it was a somewhat nearer route to Leepee ; but alas! when we arrived at the bottom the torrent had washed away the bridge, and although we might have forded the stream, we learned from some shepherds that it would be labour lost, as the road up the opposite side of the glen had given way and followed the bridge down the stream, so that it was impassable. In this dilemma we had nothing left for it, but to reascend on the side we were on, and the shepherds gave us some comfort, by saying we need only climb up a little way, when we should find a path. To work we went accordingly, setting our faces to the hill with a willingness that did not last very long, for we found that the short way of a Kunawurree was something like the " mile and a bittock" of bonnie old Scotland, " aye the langer, the farther we went."

This was truly the steepest hill-side I had ever encountered. Without the vestige of a path or any track, up we toiled, now grasping by the rock, and now by the roots of shrubs or tufts of grass, until at last it got so bad that we could scarcely proceed at all, partly owing to the steepness, and partly to the slippery nature of the pine leaves which thickly covered the soil. At several places the first up was obliged to let down a rope or a part of his dress to assist the others up. After a time, however, as we approached the top of the hill, and when well nigh exhausted with fatigue and heat, the ascent became more easy, and at last we debouched from the forest of pines upon a large open, swampy tract, immediately below the snows, which supplied water for a hundred rills, studded with a small yellow flowered ranunculus that I have some recollection of having seen in

similar situations in Europe. There were here many plants familiar to me, as the strawberry, the little pheasant's eye, the mare's tail, and a plant in search of which many of us in our boyish days have wandered through the fields of old England, in order to feed our rabbits, it is known, if I forget not, by the name of "queen of the meadows," or "meadow sweet," and grows abundantly, as it does here, by the side of ditches and brooks. The currant, wild rose, and dwarf willow were plentiful also, especially the latter, for which the swampy nature of the ground was particularly genial and adapted. Here we at length found the path for which we had so long toiled in vain, and now when found, as often elsewhere happens, it was not worth the trouble it had cost, being but a mere sheep track along the side of a decomposing and crumbling hill, where the footing was as insecure as well could be, and where the prospect below was inevitable death to the unfortunate who should misplace his foot or lose his balance. Time and care however took us safely to Leepee, where I was right glad to find my tent pitched; and as the Himalayan ibex or sikeen was said to be found in the neighbourhood, I determined to make it an excuse for halting a day or two. This measure had moreover become somewhat necessary, for the toil and fatigue of climbing over such broken and rugged paths as we had travelled for the last three or four days, in the heat of the noonday sun, when the thermometer generally indicated a temperature exceeding 95°, had brought on so severe a pain in my right side, that often I found it absolutely necessary to lie down for awhile on the ground, until it had somewhat abated. This, added to a severe cold, caught from the necessity we were sometimes under, of wading when profusely heated with walking, nearly knee-deep through several streams, whose waters having only recently left the beds of snow above, caused the thermometer to stand at the cooling temperature of 38°, made it necessary that I should take a rest, and while doing so, I determined to dispatch men into the upper glens in search of the long wished for ibex.

On arriving at my tent I made immediate inquiries for sportsmen, or shikarrees, and heard to my dismay that the only man in the place who knew how to handle a gun, had gone "away to the mountain's brow," to sow phuppra seed for the autumn crop. Seeing my disappointment at this unexpected piece of bad news, a little dirty, half-clad urchin offered to start off to the shikarree and tell him that a "Sahib" had arrived, which news would of itself be sufficient to bring him down. I asked how far he had to go, and when he would be back? to which he replied, "It is eight miles going and coming, but

we'll be here by sunset! At this time it was one o'clock in the day, and the first four miles were up a hill that appeared in the distance to be almost inaccessible to anything but the ibex itself, yet the hardy little mountaineer was true to his word, and returned before sunset with his friend the hunter. He was a black-faced, short, square-built fellow, with scarcely any perceptible eyes, so shaded were they by his bushy projecting eyebrows, and high cheek bones. He was well clad in woollen clothes, and round his waist was fastened a brass chain, from which was suspended a steel, a powder flask, and a long sharp knife. He was a hardy looking fellow, and from his frank and easy manner evidently one who could boldly look danger in the face, and who knew how to meet it like a man. He was as keen and anxious for a brush with the ibex, as I was to obtain one, so that powder and balls being furnished, he declared his readiness to start by break of day. As to my attempting to go with him, he laughed outright at the idea, and said at once, unless I staid where I was, he would not go, for I should infallibly break my neck, and spoil his sport into the bargain.

The chase of these animals is one often attended with great danger, from the inaccessible nature of the cliffs among which they love to roam, and there are few who are hardy enough to follow it. Often the hunter is obliged to crawl on his hands and knees along some ledge of rock projecting over a glen or chasm of several thousand feet in depth, and from such a spot laying on his belly, snake-like, he draws himself along, takes aim, and fires on the unsuspecting herd. If the shot be successful, it is still a matter of much difficulty and danger to procure the quarry, from the steepness of the rocks among which it lies, and too often the last struggle of departing life causes it, when almost within the hunter's grasp, to slip off the ledge, and fall headlong with thundering crash down into the yawning gulph, a prey to the vulture and the crow. These animals are sought for chiefly for their skins, which are either sold or made into shoes, &c. and the horns are presented as an acceptable offering to the deity, and nailed upon the walls of the temples.

Matters being soon arranged, my sturdy friend departed to the hunting ground, accompanied by a shikarree whom I had brought with me from Kotgurh, promising to do his best, but saying that most likely he would get nothing, as the summer season coming on, caused the animals to retire to the last ridges of the mountains, where no man could follow them.

About sunset on the following day, my own shikarree returned

with a long and rueful countenance, and announced the unsuccessful termination of the day's sport. They had found a small herd, chiefly of females, and had each a shot, but with no other effect than that of scaring away the game, and nearly throwing the Leepee hunter over the cliff, for the English powder I had given him caused his match-lock to recoil so violently, that both were nearly taking flight to the depths below. On inquiring for my flat-faced friend, it appeared that he was ashamed to face me again empty handed, and therefore had stopped on the hill-side for the night, at a shepherd's hut, from whence in the morning he could easily repair to his sowing in the heights. I sent him next day a large clasp knife, with a message to be ready for me on my return, when I would give him a chance of retrieving his character as a shot. His son, who undertook to deliver the knife, seemed highly delighted with the present, and declared that I should have a specimen of the sikeen on my return, but alas, as will be seen hereafter, these promises were fated to be broken.

On the 6th of June I resumed my journey, somewhat recruited by the day's rest I had enjoyed, and proceeded by a steep ghat to Labrung and Khanum. Descending to these places from the summit of the pass, the road lay through a scattered forest of Neoza and Kayloo pines, intermingled here and there with the cedar of Kunawur, the first specimen of which we saw at Leepee. It appears to be a species of juniper, and sometimes attains a goodly size, though generally it is dwarfish, and crooked in the extreme. The names by which it is known in Kunawur and Hungrung are "Lewr," and "Shoor;" its wood is esteemed as incense, and offered by the Lamas to their gods. Small quantities of it are also burned to charcoal and used in the manufacture of gunpowder. The planks obtained from it are used in the construction of temples, and they are sometimes also in demand at Simla, to make boxes with. Scattered over the more open parts, were beds of juniper and tilloo (also a species of cedar used as incense) and the yellow flowering furze already seen near Chini.

After an easy march we encamped at Labrung, a small and filthy looking place, built on the edge of a shelving hill. The town of Khanum is of goodly size, and stands opposite to Labrung, the two places being merely separated by a narrow glen. In this town many Lamas reside, but at the time of my arrival the principal of them had gone to Simla in the train of the Rajah, or in other words, "the chief had put his tail on," and their presence was required to form part of it.

The season here appeared to be far behind those of the lower parts of the district, the barley being yet green and far from ripe, while

below it had long been reaped and housed. Khanum is said to produce the best sooklat, or woollen cloth, of any town in Kunawur; it is made chiefly of the byangee wool, or fleece of the Choomontee sheep, in Chinese Tartary.

From Labrung there are two roads to Soongnum, the next stage, one lying along the base of the hills, which is very bad, and merely a bye path; the other crossing the Koonung pass, which although quite practicable, was represented as being still deeply buried in snow. My people however declined attempting the heights, and preferred taking the lower road, so I started alone with the Churriah and a guide across the mountain path.

The ascent is long and steep, as may be gathered from its crest being 5,212 feet higher than our last encampment; it is however far from difficult, and the road is excellent, but unfortunately at this season we saw nothing of it above 13,000 feet, as it lay buried in the snows, which were spread in a broad white sheet over the whole range. Following the traces of a flock of sheep which some days previously had crossed the pass, we managed to do well enough without the road.

From Labrung we first ascended through a forest of Kayloo and Neoza pines, beneath which were spread vast beds of junipers and furze, with here and there a few fine currant and gooseberry bushes loaded with small green fruit, but as yet far from ripe. Farther up, these beds of junipers increased, and were intermingled with another species growing more like a bush, and the same as is known at Leepee by the name of Tilloo.

Gradually as we mounted up the hill, the pines decreased in numbers and in size, dwindling at length to dwarfish shrubs and ceasing altogether at about 12,500 feet of elevation. Here first began the snow, lying in large fields or patches, and uniting at about 13,000 feet into one broad unbroken sheet, from whence to the summit of the pass, or 1,500 feet more, it continued so. The depth generally was not great, though in some places up to the middle or even higher; where it had drifted or had been hurled down in avalanches from above, of course the depth far exceeded the stature of a man.

The only danger in crossing these fields of snow at this season, when the thaws commence, is for loaded people, for if they fall in deep or broken snow, they run a risk of either being smothered beneath the weight of their burdens, or of losing the things they carry. The fatigue however, even to us without any loads at all, was great and distressing, owing to the steepness of the latter part of the way, for the path which winds gradually to the crest being lost to sight, we were

obliged to steer for the top of the pass by a direct line upwards, and the uncertain footing we obtained in the snow, which constantly gave way beneath our feet, caused us to slide backwards down the hill for many yards before we could stop ourselves again. The sheep track too, which had hitherto been our guide, at last failed us, and we journeyed on by guess; we had however the whole day before us, and a bright unclouded sky, so it signified little how long we took in ascending.

About 800 feet from the crest of the pass, I observed in the snow the prints of feet, which at first I thought were those of a man, but the deep holes made by long claws at last arresting my attention, I found on a closer inspection that they were the traces of a bear. Well knowing that in dangerous places the instinct of a brute will often lead him safely through difficulties where man with all his knowledge would fail, I hailed these traces as an assurance of our safety, and at once unhesitatingly committed myself to bruin's guidance; nor was I wrong, for following his footsteps, they gradually led me beyond the snow, and were lost.

The crest of the ridge was uncovered for about 50 feet on the southern slope, and here we again found the road, which was visible just long enough to assure us that we were in the right direction for Soongnum, and then again disappeared beneath the snows on the northern side. I have often been told by shikarrees that there are two species of bears in the hills, a black one which feeds on fruits and grain, and which is the common Thibet species, (Ursus Thibetanus) and another of a reddish sandy colour, which is only seen on the confines of the snow; this species is said to feed on flesh. It is curious that the traces of the bear on Koonung pass should have been exactly on the line of direction taken by the flock, whose dung being scattered occasionally on the snow shewed that they too had gone the way that we afterwards by bruin's direction followed. It would seem at least to give some colour to the assurance that this bear lives upon flesh, for from the foot of the pass on either side, that is, from 12,500 feet to its crest, which is 14,508 feet above the sea, there was not a blade of grass perceptible, and only here and there, where the snows melted or slipped away, were a few plants of a species of "Potentilla" beginning to show themselves. If then this bear lived upon vegetables, he had nothing here but the junipers and furze. It could scarcely be possible that he had scented the grain with which the sheep were laden. The Churriah who accompanied me from Rampore, and who lives near Nachar and Tranda in Kunawur, declared that the two bears were of the same species, and that both lived on flesh as well as vegetables,

often attacking the flocks and even cows during the severity of winter, and that he himself possessing flocks, knew it to his cost. In this case it is most probable that the animal had left the forest below the pass, and traced the sheep by the scent they had left on the snow.

On gaining the summit of the pass, the thermometer only indicated a temperature of 45° at 10 A. M., and a cold keen wind was blowing from the southward. From this elevated spot we looked back over the snow-clad mountains, beneath whose summits or along whose sides we had for several days been travelling.

Viewed from this height they appeared to be nearly on a level with ourselves, and wearing a look of cold and dreary solitude, which gave a sternness to the scene not altogether pleasing to behold, as one could not help experiencing a feeling of loneliness and melancholy at the thought of losing the way, or being benighted on their hoary summits. Rising conspicuously above the rest were seen the mighty Kuldun peaks, presenting in the glare of noon a dazzling whiteness that pained the eye to view; beneath this group we had encamped at Chini.

"Far as the eye could reach, or thought could roam," all was one broad unvarying waste of snowy peaks, unbroken by a single shrub or tree, except in the depths of the darkly wooded glen, which stretched along the bottom of the pass where we were standing. Not a sound nor a rustle even caught the ear, save the rushing of the keen wind that was drifting the snow in wreath or spray before it; not a living thing was seen to stir amidst this wild and majestic scenery. All was so calm and still that it chilled one to behold it, and but for the ragged and shattered peaks around, which told of the fearful warring of the elements upon their crests, the traveller might almost suppose that the elevation had carried him beyond the strife of storms, to which this lower world is subject. It is amidst scenes like these, where words cannot be found adequately to describe the grandeur and magnificence that every where delight the eye, that man is lead involuntarily to acknowledge his own comparative weakness and insignificance, and as he views the stern cold majesty of the wintry and never fading waste of snows by which he is surrounded, spite of himself his thoughts revert to Him, the impress of whose mighty hand pervades the scene, and by whose merciful care alone, he is guided safe through countless and undreamed of dangers.

From the crest of this pass, looking north-easterly, we beheld far below us, at the depth of 5,000 feet, the town of Soongnum, to attain to which we had still before us a tolerable day's journey. On making

some remark on the length of the route from Labrung to Soongnum, the guide now for the first time informed me that it was usually made in two marches, but fearing that I should feel it cold if I slept a night on the pass, he had not told me so before, least I should have halted there. Tired with the ascent, and the toil of climbing over the slippery snow, I did not feel the least grateful to him for his consideration, which I plainly saw was more on his own account than on mine; however, as revenge is sweet, I had some consolation in the thought that he had eaten nothing that day, while I had already breakfasted, and that he would consequently be preciously hungry before he reached Soongnum. However, there was now no help for it, for the baggage had gone by a different road, so onwards and downwards we must go.

From the spot where we stood, to fully two miles and a half below us, was spread one pure unbroken sheet of driven snow; beyond this for half a mile more it was broken and lying in detached masses. No vestige of a road was seen of course, until far below where the snow had ceased. There was however no danger, although the descent was somewhat steep; and the guide setting the example, we seated ourselves on the snow, gave a slight impetus at starting to set us in motion, and away we went on the wings of the wind, at a rate which seemed to the inexperienced to argue certain destruction. I had not gone very far, when I began to feel my seat rather *moist* and *chilly* from the melting of the snow, and by no means pleasant to the feeling, so I dug my heels well in, and brought myself to a stand still. Another of the party wishing to follow my example, and not sticking his heels firm enough into the snow, toppled over from the rapidity with which he was descending, and rolled away heels over head a considerable way down the hill, amidst the shouts of laughter, which we sent after him. He got up as white as a miller, with his eyes, mouth, and ears, crammed full of snow, and affording a capital representation of "Jack Frost."

Walking, although requiring some care to keep myself from falling, was far preferable to the chilly seat; and after sundry slips and slides, I succeeded, much to my satisfaction, in reaching a spot where the snow had melted away. But my situation after all was not much mended, for the cutting wind that was blowing from the pass, soon converted my moistened inexpressibles into a cake of ice, which was infinitely worse than the melting snow, and my legs and feet soon became so benumbed by the cold, that it was painful to move at all. Seating myself once more, by direction of the guide, I took off

my shoes and socks, and proceeded with a handful of snow to rub my feet and ankles, which although somewhat painful at first, soon restored them to a healthy glow, and then by jumping and fast walking backwards and forwards, I was enabled shortly to start again, and proceeded downwards by a path infinitely more dangerous than the snows we had just quitted.

Junipers and furze were the only signs of vegetation until we again entered a thin forest of pines lower down, through which we continued to descend until we crossed the Kushkolung river below by a capital sangho, and soon after arrived at Soongnum fairly fagged.

The fatigue of this double march may be readily conceived by those who have scaled the rugged sides of the hoary headed Ben Nevis of our fatherland; the height of that mountain above the sea does not exceed that of Subathoo in the lower hills, or about 4,200 feet, and its ascent and descent, if I recollect aright, occupies from 3½ to 4 hours. Here we ascended from Labrung to the height of 5,212 feet, over snows which were incessantly giving way beneath the feet, and causing us to slip backward many paces, added to which was the glare from the sun, which tended not a little to increase our fatigue and discomfort. From the summit of the pass our descent was 5,168 feet in perpendicular height, but the sinuosities of the road made the actual distance travelled from Labrung to Soongnum at least 15 miles.

When we recollect also that from the snow to Soongnum we travelled in a temperature of nearly 90°, the fatigue of the whole march can scarcely be conceived by those who have not experienced it. Our ascent and descent each exceeded that of Ben Nevis by one thousand feet, and there are few who have performed that journey who were not right glad to get a rest and a bit of fresh salmon, (to say nothing of the whisky toddy) at the snug little inn at Fort William. We left Labrung at six o'clock in the morning; at 10 A. M. we reached the pass; from thence to the bottom of the snow occupied us till noon, when the thermometer indicated 89°, and from thence we arrived at Soongnum at half-past 2 P. M., making the whole time from Labrung to Soongnum, eight hours and a half; or allowing at least two hours for resting and looking at the scene, we performed the actual distance in six hours and a half.

The coolies who had gone round by a lower and somewhat longer road did not arrive until 5 P. M., when they begged for a halt the next day, which I readily granted, as much on my own account as theirs, for the nature of the road from the snow to Soongnum was as if all the sharpest stones in the country had been collected there,

by which not only were my shoes cut to pieces, but my feet blistered and swollen also.

On entering the town of Soongnum I was met by a son of the vuzeer, who welcomed me with a plate of raisins, and escorted me to a small bungalow of one room, built long ago by a Dr. Wilson. Shortly afterwards the vuzeer himself paid me a visit, and proved to be no less a person than the frank and honest Puttee Ram, the friend of Dr. Gerard, and the source from whence he derived much of his information regarding the higher portions of the hills towards Ladak and Chinese Tartary. He has only lately been raised to his present rank. Time has not slept with him, nor failed to produce upon his hardy and once active frame its usual effects. He is now grey and bent with age, and his sons have succeeded him in their trade with the people of Choomontee and Ladak. The old man entered at once into a history of his acquaintance with Dr. Gerard and Mr. Fraser, and talked with pride over the dangers he had encountered with the former in their rambles through Spiti and its neighbourhood. He asked me if I had ever heard his name before, and the old man's eyes actually sparkled with delight, when pointing to an account of one of Gerard's trips, I told him his name was printed there. He has not only been a great traveller through the upper hills, but has also visited Kurnal, Delhi, Hansi, and Hardwar, though like all true mountaineers he sighed for home, and saw no place in all his travels to equal his own rugged hills; and truly I commend him for his choice. He is a tall, strongly built, broad shouldered fellow, but hideously ugly, his eyelids being large and sticking out over his eyeballs like cups, beneath which his eyes are scarcely visible. He has indeed, a face as like a *mastiff's* as I ever saw one.

From him I obtained a man who understood the Tartar language, to accompany me through Spiti, and he assured me I should experience no difficulties, as there was now a road across some parts of the mountains where, as in the days when Gerard first visited those parts, there was none at all. He informed me also that the lake called Chummor-rareel was only four days' journey from Dunkur in Spiti, so I determined if possible to get a peep at it. On inquiring for fossils, he said that Spiti produced but few; chiefly ammonites (Salick ram) which were found near Dunkur, but that the best place to procure them was on the Gungtang pass, near Bekhur, but the Chinese were so jealous of strangers looking at their country, that if I went there I should not be allowed to bring any thing away. Besides this, the pass was at the present season impassable, and from the lateness and

quantity of the snow which had fallen, it could not be open before the middle of August. Hearing that the ibex was found at Koopa and at Poo,ee, in the neighbourhood of Soongnum, I again distributed powder and balls, and sent people to hunt them, telling them to have some ready by the time of my return. I made also some inquiries regarding the "excellent limestone" which Gerard says he discovered in this neighbourhood, and which the natives told him they should henceforth use in the construction of their buildings.

Puttee Ram said he recollected the circumstance I alluded to, but added that Gerard *had failed* in his attempts to convert the stone into lime. He had brought some fragments of it from the Hungrung pass behind Soongnum, and having made a small kiln, he burned the stone, but instead of producing lime it melted down into a hard slag. The experiment failed, and it has never been attempted since. At Soongnum during the winter months, the weather is sometimes very severe, the whole of the surrounding hills being enveloped in one white sheet of snow, often to the depth of several feet. The town, standing at an elevation of 9,350 feet, is completely buried during heavy falls. At such times the inhabitants assist each other in clearing their roofs from the weight of snow, which not unfrequently yield to the pressure, and are converted into a heap of ruins. To guard against the rigours of such a climate, is therefore the business of the summer months, at which season, accordingly, houses are stored with fuel and grass, and the leaves of trees are accumulated for the sheep and cattle, which are safely housed till the severity of the winter has passed away. At this season there is little, often no, communication between village and village, the inhabitants contenting themselves with clearing a track from house to house in their own villages, but not venturing beyond. This does not last, however, throughout the winter, but frequent thaws take place, succeeded by fresh falls of snow.

This description is generally applicable to all places in Kunawur, and the Churriah who accompanied me said he recollected three different years in which the snow had fallen ten feet deep, even so low down as Tranda and Nachar. At Simla, in the winter of 1835-36, the snow is said to have been upwards of five feet, and I myself saw on the 10th May, 1836, some of it still lying on the northern side of Jacko, on which Simla is built.

On the 9th of June I left Soongnum, and proceeded towards the first Tartar village of Hungo, by the Hungrung pass, which rises up behind Soongnum to the height of 14,837 feet above the sea. The road

led us up a glen by the side of a stream which had its origin as usual among the snows on the pass. The ascent although greater than that from Labrung to the Koonung ghat, was more gradual, and consequently much easier; nor had we so much snow to climb over, as at the former pass. The bushes in this glen, (for trees had ceased to grow) consisted of a great number of rose, currant, and gooseberry bushes, which yielded as we ascended higher on the mountain's side to furze and junipers. Towards the summit of the pass these were so thickly spread around, and the hill had such a gradual slope, that substituting furze for heather, the scene had much of the appearance of a Highland Muir, nor was this resemblance at all lessened when with a loud whistle up sprung before us from the covert some beautiful large partridges, whose plumage is very like that of the ptarmigan in its summer dress, being a mottled mixture of white and grey minutely pencilled on the back. These birds are known in the language of Kunawur by the name of "Bhair." They are found in abundance near the snows among the covers of furze and juniper, retiring as the season advances to the extreme heights of the mountains. They delight to perch upon some high projecting crag, from whence, surveying the country below, they send forth at intervals a loud and peculiar whistle.

On the crest of the pass, which we reached at half past 10 A. M., the wind was piercingly cold, and quite benumbed our fingers, the thermometer again standing, as at Koonung, at 45°.

The view from this spot was dreary enough; the town of Soongnum was lost sight of behind an elbow of the range, and on either side therefore nothing but cold bare hills were to be seen; neither village, cultivation, nor trees appeared to break the chilling waste of snows which spread around and far below us over every mountain's side; no signs of vegetation were to be seen, save the brown and withered looking furze, which even at this advanced season of the year had scarce put forth a single leaf.

The summit of this mountain is, as Gerard has truly stated, composed of limestone; but the reason of his failing to convert it into lime for economical purposes was apparent enough. The rock is one of those secondary limestones which contain large portions of clay and sand unequally distributed through them, sometimes occuring in detached nodules, at others disseminated through the whole. These limestones therefore from containing this foreign matter, refuse to burn into lime, but usually form a hardened slag, or vitrified mass within the kiln, which exactly corresponds with

the account given me by Puttee Ram of the results of Gerard's experiments.

Our path now again lay buried deep beneath the snows which were spread on the northern face in a sheet from the crest of the hills to many hundred yards below us. Here too, although it was both deeper and extending farther down than on Koonung pass, the gradual descent of the mountain's side made it far less fatiguing to walk over. We left the pass at eleven o'clock, and though we ran at a good jog-trot sort of a pace down the hill, it took us nearly three quarters of an hour by the watch ere we had cleared the first unbroken field of snow. Beyond this it was lying in patches, and here and there quite sloppy, so that my shoes, stockings, and half way up my legs were wetted through in a few minutes; lower down still, the water was running in deep streams from the snow, and as the track which had been dignified with the name of a road, was somewhat hollowed out on the mountain's side by the action of the feet of sheep and men, it of course formed a capital aqueduct, and accordingly a pure crystal stream ran along it, in which we were obliged to walk ancle deep (for there was no other safe footing to be had) for a couple of miles nearly, the temperature of the water being 43°, while that of the sun was burning over our heads at 90°. After about three hours walking and sliding by turns, we reached Hungo, a miserable ruinous village situated in a dreary glen at the foot of the pass, on a large and nearly flat tract of well cultivated land, at an elevation of 11,413 feet, and about 3,624 feet below the crest of the Hungrung pass. The snow was lying in a solid mass from the top of one of the glens arising from near the summit of the surrounding heights, down to within 150 feet of Hungo. This is however a most unusual occurrence at this season of the year, the snows having generally all disappeared from these heights by the beginning or middle of May, excepting in some of the deep recesses and ravines at the very summit of the range. Not a tree was to be seen, even at this elevation, except a few sickly looking poplars on the banks of a stream below the village, all of which had been planted there by the hand of man. The hills rising immediately behind this village are not however bare and barren, but are well covered with the furze already mentioned, which was just beginning to put forth its beautiful yellow flowers. Along with it was another species which until to day we had not noticed; it is smaller than the other, bears the same yellow flower, and extends to a much greater elevation; both are called "*Tama*," but the last mentioned is distinguished as "Cheenka Tama" or Chinese furze. The other species is termed by Gerard

"Tartaric furze," but the name is scarcely appropriate, since the plant is equally abundant over the higher hills of Kunawar, as on those of Tartary; and from the extensive range it takes, the name of "Himalayan furze" would suit it better. Besides which the species most common to the heights of Tartary is that known to the natives as the "Chinese furze." Both these species are cut and dried in the summer months, and form nearly the only fuel the Tartars are possessed of.

Lower down the glen, the hills assume a more desolate appearance; the furze grows scantily and at last fails altogether, leaving a bare and crumbling soil, which is annually precipitated in quantities by the action of the weather into the stream which winds it way down to join the river Lee. Over the upper part of these hills the furze is also abundant, as well as an aromatic plant, which furnishes an excellent pasturage in most of these elevated regions, where grass is either scarce or not at all procurable, to large flocks of sheep and goats, as also to the cows and yâks, which are seen sometimes, to the traveller's danger and dismay, scrambling along the whole hill-side, and hurling down stones and fragments of rocks directly on his path. It often happens too that large masses are detached by the action of the frost, and come tumbling down with a thundering crash into the glens below, rending and tearing up the soils in their descent, and scattering the fragments in vollies into the air. One of my coolies had a narrow escape from a fragment of rock, below the Hungrung pass; a mass that had hitherto been supported by the bed of snow into which it had alighted from above, was now by the thawing of the snow again let loose, and came bounding down the hill with horrid crash, until striking on a projecting crag, it was shivered into fifty fragments, one of which fell in a direct line for the coolie, who frightened at the sight, and hampered by his load, fairly stuck fast to await the coming blow. By the greatest good luck he escaped unhurt, though the stone alighting full in the kiltah on his back rolled him head over heels down the side of the hill. He soon recovered himself, however, when it was found that the only damage done was a crushed leg, not of the coolie, but of *mutton*; my provisions being in the unfortunate kiltah.

On crossing the Hungrung pass a most remarkable alteration is observable in the aspect of the country. The range on which the pass is situated forms part of the northern boundary of Kunawur, separating it from the Tartar district of Hungrung, now forming a portion of Bussaher, although evidently at some former period it has been sub-

ject to, and constituted with the Spiti district an integral part of Chinese Tartary.

The change in the nature of the country is most sudden; looking from the summit of the range in a northerly direction over Hungrung, the country is seen to wear a sad and sombre air of cheerless desolation; not a tree is to be seen, and the black and crumbling hills are either wholly barren, or clothed with nothing of larger growth than the dwarf willow and the dog-rose. The hills are chiefly of the secondary class, and being more rounded in their outline, want the grand and almost terrific beauty of the towering granitic peaks which so strongly characterises the scenery of Kunawur. Villages are situated at wide intervals from each other, and cultivation is wholly confined to the immediate vicinity of them, and usually upon a confined patch of alluvial soils, evidently the deposits of some former lakes. The practice of cultivating in steps upon the mountain's sides, appears indeed to be almost universally neglected, which however is most probably owing to the nature of the hills themselves.

On the southern side of this range lies the thickly wooded district of Kunawur, where cultivation is often carried in steps nearly to the summit of the mountains, and presenting a rich and cheerful picture which delights the eye, and imparts a feeling of joyousness and security to the traveller, as he wanders on through forests of majestic pines.

From this difference in the appearance of the two districts and their inhabitants, it would seem as if nature had elevated or interposed the Hungrung range as a barrier between two countries, destined, for some purpose, to remain distinct; and furnishes to the inquisitive a source of speculative thoughts, from which it is difficult to draw any satisfactory conclusions, for the mind is almost involuntarily lead to ask while contemplating this marked contrast, *why*, on the one side the forests should be allowed to advance actually to the mountain's base, while on the other not a single tree should be allowed to grow.

From Hungo, on the morning of the 9th of June, I proceeded to Leeo, which is a small village situated on the right bank of the Sing Pho or Lee river, in a basin or valley entirely surrounded by high granitic rocks. The spot has evidently formed part of the bed of a deep lake, the different elevations of the water being still apparent in the lines of rolled stones, which are seen on the hill-side, far above the level of the river.

The bottom of the lake, now furnishes a broad and level tract of land which is well cultivated, and from its warm and sheltered situa-

tion in the bosom of the hills, is highly fertile, producing in favorable seasons two crops, consisting of wheat, celestial, beardless, and common barley, with beans and peas. Apricots too are abundant, but this is the last village towards Spiti where they occur. The elevation is however only 9,362 feet, or about that of Soongnum in Kunawur.

From Leeo, I proceeded towards Chung or Chungo, leaving the village of Nako on the heights to the right. At Leeo we crossed the Lee by a crazy and not very agreeable sangho, the planks being so far apart that the water was seen rushing along at a fearful rate beneath, dazzling the eyes with the glare of the foam, as one looked down to secure the footing; a very necessary precaution, as the bridge from the bank slopes with a disagreeable curve towards the centre. From this we ascended to about 2,000 feet above the stream, which was a steep pull up, though luckily we had a cool and cloudy day. The road, which is very rocky and leads along the left bank of the Lee, lies generally over immense beds of fragments brought down by the elements from the heights above, and after one or two moderate ascents and descents, dips suddenly down, at the distance of nine miles from Leeo to the village of Chungo.

On the 12th of June I halted at this place for the purpose of laying in several days supply of grain for my people, in case we might not be able to procure any in Spiti, which, according to accounts we had received at Soongnum and other places in Kunawur, had been plundered of every thing by Runjeet's troops, after they had expelled the Rajah of Ladak. The Tartar guide, however, who accompanied me, declared the rumour to be false, as he had lately been in Spiti and found no lack of grain, and he therefore advised me not to burden myself with more coolies, which would be necessary if I carried supplies. In order to be safe I thought it advisable to carry a few days provisions in case of emergency, and lucky it was that I did so, for without them my people would on more than one occasion have had no food at all.

Chungo is situated in a basin somewhat similar to that of Leeo, but much more extensive; it is walled in as it were on every side by lofty hills, whose sides in many places bear witness to the former presence of a lake. Large beds of clay and sand enclosing rolled and water-worn pebbles of every size occur on all sides, while the flat and level bottom of the vale again furnishes a broad tract for cultivation. The elevation of Chungo is about 9,897 feet. It was once a populous and thriving place, containing nearly one hundred people, but for some

years past it has been on the decline, and is now half in ruins and deserted by most of its former inhabitants. The reasons for this falling off are entirely attributable to local circumstances.

The soil is a mixture of clay and sand, the latter predominating, and is a deposit from the waters of the lake which once filled the valley. The whole area formerly under cultivation might probably have exceeded one and a half mile square, although at present it scarcely equals one. Celestial, beardless, and common barley, wheat, phuppra, beans, and peas, constitute the crops, and one harvest is all that is obtained; which is not to be wondered at, when we consider that on the morning of the 12th of June, at sunrise, the thermometer indicated a temperature of 35°. Snow was still lying on all the surrounding heights, and fell throughout the day on the 10th and 11th of June. In former days ere the cold soil was exhausted by the constant growth of the same crops, Chungo was at the height of its prosperity, and could even export grain to other parts, so abundant were its harvests. But alas! too soon "a change came o'er the vision of its dream," and those days are gone, now never to return.

The constant drain upon a soil naturally poor and cold, soon changes its hitherto smiling and prosperous state to one of want and poverty. The barrenness of the surrounding hills, yielding not even a scanty pasturage to sheep and cattle, at once destroyed the chance of recruiting the soil, by depriving the cultivator of the only source from whence manure might have been procured; and thus, from gathering an abundant crop, the villager was first reduced to a bare sufficiency for the wants of himself and family, and finally obliged to leave his fields untilled, and to seek employment and subsistence in a happier clime. Many have thus emigrated into Spiti, Chinese Tartary, and other places, and their once well cultivated fields now exhibit a bare and hardened sand without one blade of grass, and strewed with the fragments of rock which the weather has hurled upon them from above. Could these people command annual supplies of manure, as is the case in many parts of these hills, Chungo would possess perhaps a finer cultivation than any village in Hungrung. In Kunawur it is a common practice to mix up leaves and the young shoots of the pine trees with the dung of cattle, and this forms a capital manure for their fields, which would otherwise, in many parts, soon become nearly as impoverished as the soil of Chungo. They have moreover in most parts of Kunawur a rotation of crops, by which the soil is recruited, whereas at Chungo, one crop, and that the same for years, is all that can be produced. This village has not a tree near

it for two or three days' journey, save the usual sickly looking poplars, which are planted on the banks of rivulets and streams ; thus they are deprived of all manure both animal and vegetable, and their lands will in consequence go on dwindling from bad to worse until the place shall become barren and deserted.

The lands which are now under cultivation are coaxed to yield a scanty crop, by the annual small quantity of wheat and barley straws which are ploughed in, and by the addition of the small portion of dung which is obtained from a few goats and cows which graze on the edges of the fields, where grass and a yellow flowering lucerne spring up abundantly along the banks of the little rills, with which the fields are irrigated.

On the 13th of June, I again proceeded towards Spiti by a road which led us up the heights above Chungo. Many places on this day's march indicated the former existence of a deep water over the hills, at a height of 2,500 and 3,000 feet above the present channel of the river, which winds along beneath. Here the road stretches along the sides of hills shelving gradually towards the stream, along whose banks are wide and extensive level plains of several miles in area, and the hills receding on either side form a wide valley, bare of every sign of vegetation save the furze, the dog-rose, and the willow, with here and there a few dwarf bushes of the cedar. Trees there are none, and villages are now not seen for many days. All around seems cold and cheerless ; not a living thing to break the deep silent melancholy which pervades the scene, and the traveller feels chilled, and his spirits flag, he knows not why, as he wanders on through the dreary and barren waste.

How marked a contrast does the scene present to the rich and wooded regions of Kunawur ; here all is black and charred, and a mournful silence reigns around, unbroken save by the hoarse roar of the mountain stream, or the shrill whistle of the Bhair among the snows.

Journeying onwards from our last encampment, we came suddenly upon a deep rent or chasm in the rocks, through which at some depth below ran a rapid stream. Over this, from rock to rock a few loosely twisted ropes or withes of willow twigs were stretched to answer for the purpose of a bridge, and on these were placed large flat slabs of mica slate, apparently sufficient by their own weight alone to break through their frail support. Over this we walked, and though somewhat springy and unsteady to the tread, it was nevertheless perfectly strong, and is the only bridge for passengers and cattle. At a little distance from where we crossed, alarmed by the noise we made, up

started from among the rocks a small flock of *Burrul*, or wild sheep, which began leisurely to scale the steep sides of the glen, springing from ledge to ledge till they attained to a place of easy ascent, when, as if satisfied that they could bid defiance to pursuit, they stopped to survey our party. A shout from some one in the rear, again set them in motion towards the summit of the mountain from which we had just descended; the direction they took, lay right across the path, and just at the moment when they gained it, my shikarree came in sight, on a part of the hill above them, a shrill whistle from one of the Tartars caught the ear of the hunter, who was soon instructed by signs to blow his match and give chace.

From his greater elevation he was able to bring himself near the line the animals were taking, and at the same time to screen himself from their view until just within gun-shot, when they perceived him. In an instant a flash was seen, and the sharp crack of the matchlock, ringing in echoes among the rocks, told that the quarry had come within reach, and at the same moment off bounded the flock towards the most inaccessible part of the mountain. The shot however had not been fired in vain, for suddenly the leading sheep was seen to turn downwards and avoid the rocks, as if conscious that he had not power to scale them, and taking an easier and more slanting direction along the side of the cliff, he soon slackened his pace and laid down. The rest of the flock losing their leader turned downwards also and rejoined him. The shikarree in the meantime had reloaded, and was again warily stealing on from rock to rock upon his game, but they were now fully on the alert, and once more leaving their wounded companion, bounded up the rocks at a rapid pace. Again the bright flash of the matchlock was seen, but alas, this time there followed no report, and ere the hunter could reprime, the sheep had won the mountain's brow and disappeared. Nor had the wounded animal failed to avail himself of the chance afforded for escape, but scrambling along the side of the rocky glen, he was fast gaining on a place where a turn of the mountain would have screened him from our sight, when scrambling up a rugged and projecting ledge his strength failed him, and falling backwards with a cry of terror, we saw him, for a while quivering as he fell headlong from rock to rock, and was lost in the rush of waters at the bottom of the chasm.

No village occurring this day to bless our longing sight, we at length encamped, after a long march, on the side of the hill, at a spot where sheep are usually penned for the night when travelling with

grain. This spot was called by the Tartars Chungreezing, and here I pitched my blanket-tent at the height of 12,040 feet above the sea. We passed a cold and comfortless night owing to the high keen wind which came whistling down from the snowy peaks above us. At sunset the thermometer stood at 48°, and at sunrise on the morning of the 14th of June, again at 35°! A nice midsummer temperature! what must the winter be? On the 14th we descended by a very rugged and precipitous pathway to the bed of the Paratee river, a branch of the Lee, which comes down from lake Chummor-rareel, through Chinese Tartary, and joins the latter river above Skialkur. This we crossed by the "stone sangho," as it is called, which is formed by several enormous masses of granite which have fallen from above, and become so firmly wedge into the bed of the river, as to form a safer and more durable bridge than any that could be constructed by the natives, and which from its great weight the waters are unable to remove. A small stream which runs down into the Paratee, a little distance below this bridge, is said to be the boundary line of Bussaher and Chinese Tartary.

Here then we were in the dominions of the celestial emperor, and as we crossed the sangho we were met by a deputation from the Chinese authorities, who demanded to know what were our intentions in entering their country, and how far we had determined to travel through it, intimating at the same time very politely, that they would "prefer our room, to our company," by telling us that we need expect no assistance or supplies of any kind. I had no intention of penetrating farther than was requisite into their country, but this being the only road yet open into Spiti, I had been necessarily compelled to follow it, as after all it merely ran across a corner of their territory for about a mile or so. Wishing however to ascertain whether, after having gone through the ceremony of prohibiting our advance to satisfy their rulers, they could not be prevailed upon to wink at our proceedings, I told this rough ambassador that I would require no supplies, nor take anything from the country, if he would allow me to proceed as far as Choomontee. His reply was evidently borrowed from the Chinese officers, and was worthy of the great Bombastes himself;—"When horns grow from the heads of men, and wool is gathered from the rocks; then may the Feringee advance,—but not till then!" This was too ridiculous to be withstood, and we enjoyed a hearty laugh, while the dignified officer strutted away, pleased with the assurance that I was only crossing into Spiti.

His words brought to mind the old Scotch ballad,

"The swan, she said, the lake's clear breast,
May barter for the eagle's nest;
The Awe's fierce stream may backward turn,
Ben Cruachan fall and crush Kilchurn,
Our kilted clans when blood runs high,
Before the foe may turn and fly;
But, I, were all these marvels done,
"Would never wed the Earlie's son."—

And I thought it by no means improbable that the sequel might turn out after the same fahsion;—

"Still, in the water lily's shade,
Her wonted nest the wild swan made;
Ben Cruachan stands as fast as ever,
Still onward foams the Awe's fierce river;
Before the foe when blood ran high,
No Highland brogue has turned to fly;
Yet Nora's vow is lost and won,
She's married to the Earlie's son.

and so it may be hereafter that the "Feringee" shall tread those now forbidden scenes, though his head be unadorned with horns, and wool be not gathered from the rocks.

It appears however from the accounts of the people, that so many travellers have at different times wandered through the upper hills, without any apparent object, save that of looking at the country, that the suspicions of the Chinese have been kept on the alert, and they are more particular than ever in enforcing their orders, especially since Runjeet's troops in Ladak have thrown out some hints of paying them a visit, when they have settled the affairs of their late conquest. There is however little chance of their carrying the threat into execution, as Chinese Tartary holds out to them no chance of plunder save its splendid flocks of sheep, which would easily be driven far beyond their reach, and leave them a barren waste for their portion.

Having crossed the stone sangho, we proceeded up the side of a hill by what the guide termed a road, though I could not distinguish it from the surrounding mass of crumbling soils. It got better, however, as we gained the top, and a short distance brought us to a small stream, across which we stepped out of Chinese Tartary into Spiti, dependent on Ladak. From this we travelled for some miles along the side of a bare black hill of decomposing shale, and then descending to a level plain of clay and rolled stone, we crossed a river which the Tartars called "Gew," from its passing a village of that name in Chinese Tartary. Above this river on the opposite bank, the beds of

alluvial clays towered up to some height, and the surface being flat and studded with a few bushes was pointed out as the usual halting place. As by halting here however we should have had a long and fatiguing march on the morrow to Larree, I thought it advisable to push on for another level spot, a couple of miles farther, where the Tartars said there was a stream of good water, and shelter beneath the rocks for all my people. The road now ran along the left bank of the Spiti river, at about 300 feet above its level.

The Spiti is a larger and finer looking river than the Sutledge, and the people of the country, as well as the Kunawurees who have seen the two, say that it is never equalled by the latter, except during the winter months, when the severity of the frosts in the districts through which the Spiti flows, causes a less plentiful supply of water to fall into it.

Its waters though rapid and muddy, have in general far less of that dashing violence which the Sutledge exhibits. This is most probably to be attributed to the nature of the country through which it flows. The Sutledge winding its rapid course among hard rocks of the primary formation, must often meet with obstacles, which cause it to break in impotent fury on its banks, in waves which hurl the spray far on high, curling and bubbling as it flows along over stones and boulders of various sizes.

The Spiti, on the other hand, though sometimes violent and rough, more generally glides along in a broad and rapid sheet through rocks belonging to the secondary class, and whose less firm and solid texture yields to the action of the current, which sweeps their crumbling fragments irresistibly before it.

The observations of Dr. Gerard also serve to corroborate the information furnished by the natives relatively to the two rivers. According to that traveller, the greatest breadth of the Sutledge at its narrowest parts where bridges occur is 211 feet, while at other places he measured it 450 feet across. This however is low down, and after the river has received the additional waters of the Spiti and Para, united in the Lee; the true comparison therefore cannot be formed, after the junction of the two rivers, but before.

At Skialkur, according to Gerard, the Lee in breadth was ninety-two feet, and in August he thought it contained fully as much water as the Sutledge, than which it was broadest, the latter river being at their confluence but seventy-four feet. The true comparison of the Spiti and the Sutledge, must be instituted however, before the junction of the Paratee with the former, and of the Lee with the latter,

and we consequently find from the measurements of the enterprising traveller already mentioned, that the general breadth of the Spiti was from 258 to 274 feet across.

In October, he states the quantity of water to be less than that of the Sutledge, which being the season when the rigors of winter have begun in Spiti, is exactly a result corresponding to the information derived from the inhabitants of the district.

After the waters of the Spiti and Paratee rivers have united to form the Lee, the Tartars usually apply to it the name of "Singpho," which in their language appears to signify "a river"; while smaller streams and muddees, are called "Rokpho," or nullahs. Each river is therefore distinguished by the name of the country through which it flows, or sometimes even by that of a village on its banks. Thus the Lee evidently derives its name from the village of Leeo, and is the "Lee-ka-Singpho"; the Paratee, rising from lake Chummor-rareel, and flowing through Chinese Tartary, is called the "Cheen-ka-Singpho," or "Para-ka-Singpho," derived from the Para or Paralassa mountains; and the Spiti is the "Spiti-ka-Singpho." The word Para signifies lofty, and thus Paratee is literally, "Lofty-water," or a "river of high source," "tee" signifying water in Kunawur. Paralassa would therefore appear to signify a lofty mountain range, as "Kylas" is known to signify lofty peaks in Kunawur. The Lingtee, a minor stream which joins the Spiti above Dunkur, but of which Gerard makes no mention; and the "Gew" flowing down from Chinese Tartary into the Spiti below Larree, receive the names of "Lingtee-ka-Rokpho" and "Gew-ka-Rokpho" both derived from villages on their banks. After resting awhile beneath the shade of an overhanging rock and refreshing myself with a few hard biscuits, and a drauhgt from the turbid stream, we again set ourselves in motion, and a walk of two or three miles brought us to an extensive piece of level ground, where the guide said we were to encamp, and accordingly we halted, right glad to get a rest and shelter from the sun, in the shade of the rocks around us.

Creeping into the caves which are scooped out by the wandering shepherds as a place of shelter for the night, most of the party soon fell fast asleep, for we had travelled several miles in a temperature of 120°, and the glare from the rapid waters below our path, in conjunction with the heat from the rocks, tended to induce a feeling of langor and fatigue, which from the proximity of the snow on the heights above us, we had little expected to feel. We had thus wiled away about two hours in the arms of Morpheus, when we were aroused

by the noisy arrival of some of the people with my tent and baggage, and proceeding in search of water, we now first ascertained to our dismay that the stream was dry; fuel, too, another most essential necessary, was likewise wanting; so bestowing a few hearty growls on the Tartar for his stupidity, we once more proceeded in search of a snow stream and some bushes.

Luckily we soon came to a spot which furnished the latter, but as there was no stream near we were obliged to content ourselves with the water of the muddy river.

Here then we encamped once more on the hill side, without having seen the vestige of a habitation throughout this second day of our wanderings in Spiti. Around us, however, were plenty of rocks to afford shelter to my people in case of a storm or bad weather, and as the day was fine and warm, we managed to make ourselves tolerably comfortable in spite of muddy water, and a scarcity of fuel, which latter consisted solely of the dried stalks and roots of a small shrub growing among the rocks near us.

During the day's march we had passed over many level tracts of alluvial soils which seemed so well adapted for cultivation and villages, that I remarked to the guide my surprise that so much level land should remain neglected, while so much trouble was expended in Kunawur on strips on the hill side. He replied that many a longing eye had often been directed to these plains, but the difficulty or rather impossibility of conveying water to them, had deterred all from settling there.

These broad alluvial deposits are now all high above the river's course, and from the precipitous nature of the rocky banks within which it is confined, no aid could be derived from it.

Rain is here almost unknown, falling only like angel's visits, and even then so sparingly as to be of no use except to allay the clouds of dust for a few hours.

The only season, then, in which much moisture is obtained, is precisely that in which no vegetation can be produced, namely in the winter months, when falls of snow are both heavy and frequent, and continue often, more or less, from August till the end of April.

Of these broad flats the people would gladly avail themselves could water be procured to irrigate them, and smiling fields and prosperous villages would soon appear where all is now barren and desolate. On similar deposits are the villages of Leeo, Chango, Soomra, and Larree, built where streams flow down from the surrounding heights to fertilize the soil. They are, however, almost all subject to a great

want of manure, and their fields in consequence soon become impoverished, and do not yield a suitable return for the care and labour which are bestowed upon them.

Thus at each of these places, with the exception of Leeo, many fields once under cultivation are now left barren, and their owners have been compelled to seek that subsistence for their families in some more favoured spot, which their native soil denied them.

THOMAS HUTTON, *Capt.*

CANDAHAR, *Assistant Paymaster and Commissariat*
8th December, 1839. *Offit. S.S.F.*

ART. III.—*Notes on various Fossil Sites on the Nerbudda; illustrated by specimens and drawings.*

In the following paper I propose to place on record the progress made in fossil discoveries from Hoshungabad up the Nerbudda river, to Jubulpoor, a distance of some 200 miles.

Hoshungabad has already been brought to the notice of the Society as a large deposit, a field zealously followed up by Major Ouseley, then in charge of that district, by whose exertions the upper jaw now laid before the Society has been brought to light, having served for years, unknown, as a Dhobee's board for washing clothes on, ere a cognoscent eye lit upon it; for at first, it had the appearance only of an oblong square mass of the conglomerate of the river, excepting at one small point, which led to its development and present form. I am sorry to say that some of the teeth were injured in entrusting the chiselling to a country gentleman, whose geological notions of matrix and fossil, were not matured. The teeth of this elephantine head are thought by a friend of mine, to belong to that species denominated African.

The second specimen laid before the Society, is that of a slender tusk, imbedded in the conglomerate of the river, the several pieces of which, joined together, amount to a length of five feet nine inches and a half. To what animal did this belong? The portion of tusks of elephants that we possess, being at least treble the present in circumference.

Next are drawings No. 3 and 9, frontal and base of a Buffalo skull, from the same locality; exhibiting in one, the condyles of the foramen magnum, orbit; portion of horn, and general base of the skull; the other shewing the massy forehead, (nearly eleven inches between the orbits), and angle of the horn in contrast with the Bovine skull to be noticed hereafter.

No. 4, are drawings of the vertebræ of the Mammoth ; the centre one, which is extremely perfect, was found imbedded in the same matrix as the foregoing, near the village of Bikore, some fifteen miles up the river from Hoshungabad. On the same paper a convex and concave view of another vertebra of considerably larger dimensions has been annexed, with their different measurements on the same scale, shewing their relative size. The latter was found in this neighbourhood.

No. 6, is portion of a ruminant jaw from near Niaghurreea, on the Barunj Nulla, and about a kos from Beltharee Ghat,* on the Nerbudda. The specimens brought in have been chiefly similar jaws and cylindrical bones of either buffalo or bovine genus. This site has not yet been visited by us.

No. 7, a drawing of a Bovine skull, exhibiting some of the molar teeth. No. 8, is a frontal view of the same. This skull was for a long time unique, and was dug up at Heerapoor, on the right bank of the Nerbudda, at the junction of our boundary and the Bhopul state ; but since this, numerous skulls from near Jhansee Ghat have been sent in ; they are characterized by very large molars, and a great squareness of the occiput, a point not shewn in these drawings; the horn is imbedded in matrix, so that its actual circumference is not easily determined, but it appears to fall short of the buffalo skull No. 3, and as it does considerably in breadth of forehead.

No. 10, 11, 12, are specimens from Brimhan Ghat, of two skulls and a cylindrical bone. This site was first brought to notice by myself in 1833, subsequently explored by Captain M. Smith, then in charge of the Saugor district, and latterly by Mr. C. Fraser, the Agent. The chief specimen† was the head of a mammoth ; the dimensions of which, as compared with a recent skull of an animal seven feet high, were enormous. The foramen magnum of the occiput was three inches and a half; diameter of tusk at base, six and a quarter inches ; and as it stood on the occipital condyles, the height was thirty-three inches ; breadth of the molars four inches. The fossil remains here have been chiefly those of the elephant and bovine classes.

From Brimhan Ghat, proceeding upwards, we come to Sagounee and its neighbourhood—sites from which I sent numerous specimens that have been laid before the Society, and among them a buffalo head with horns (a delineation of which was promised in my preceding communication) with one sent down by Serjeant Dean from the Jumna.

* From this Ghat, in 1834, I forwarded fossil specimens, pronounced to be those of a horse.

† It has been sent to Capt. Cautley for comparison with those of the Sivalik range.

Our next site is Jhansee Ghat, where the bivalves (drawings of which were lately forwarded for inspection) have been found. This place and its neighbourhood has yielded a large collection of fossils, but chiefly buffalo and bovine; vertebræ and leg bones of the first, and large skulls of the latter, bearing the same character as that delineated in No. 7. From this ford all the way up the river fossils have been found. At the Jogee Ghat, three miles below Berah Ghat, the upper portion of the head of a young hippopotamus was discovered, as shewn in No. 14. The upper coloured drawing gives a view of the entire fossil on a reduced scale, and the pencil one below a profile, natural size, from the anterior to the posterior molars of the left side. This is the first and only one of the kind; almost all our collections being derived from the elephant, horse, buffalo, and latterly a large bovine class, as noticed before.

In the ravines of the Nerbudda, close to Berah Ghat a fine lower jaw of a mammoth was excavated and brought in, of which No. 15 gives an accurate facsimile, and some idea of the stupendous animal it was originally attached to.

Above Jubulpoor, as far as our present researches extend, but few fossil remains of quadrupeds have been found, the perfect head of a horse (drawings of which were laid on the table some two years ago) forming one of the few exceptions.

From Chewlea upwards, fossilized trees of various kinds and shells alone reward the zeal of the philo-geologist.

For the interesting fossil discoveries from Jubulpoor to Jhansee Ghat the lovers of this pursuit are indebted to Mr. C. Fraser, the present Agent to the Governor General in these territories, who from the time of his rejoining this agency, has been most indefatigable in bringing to light these treasures of a former age.

I cannot pass over the aid I have derived in my illustrations* of the fossils for the present notes (as well as those lately submitted of the different kinds of shells, chiefly found in these territories,) without saying how much I am indebted to the pencil of Captain Reynolds, whose kindness and readiness to devote his time and talent to the delineation of the numerous specimens sent to him, have been unwearied.

N. B. Just as the foregoing was concluded, a fossil crab was brought in from near Jhansee Ghat, a drawing, No. 16, natural size, exhibits this as yet unique specimen.

JUBULPOOR, 1*st Nov.*, 1839. G. G. SPILSBURY.

* No. 3 is by Mr. M. C. Ommanney—not the first instance, by many, that I have had of his ability and kindness.

ART. IV.—*Proceedings of the Asiatic Society.*

(*Wednesday Evening, the 5th February*, 1840.)

The Proceedings of the last Meeting were read.

His Excellency Sir Jasper NICOLLS, Commander-in-Chief, &c. &c. and Maha-Rajah RAHMUT ALI KHAN, proposed at the last Meeting, were ballotted for, and duly elected Members of the Society.

The Society then proceeded to the election of Vice-Presidents and the Committee of Papers for the ensuing year, when the following gentlemen were chosen:—

Vice-Presidents.

The Honorable Sir J. P. GRANT.	The Honorable H. T. PRINSEP, Esq.
Colonel D. McLEOD.	The Honorable Sir H. SETON.

Members of the Committee of Papers.

W. GRANT, Esq.	Dr. D. STEWART.
Major W. N. FORBES.	D. HARE, Esq.
Dr. J. M'CLELLAND.	H. TORRENS, Esq.
Dr. N. WALLICH.	Dr. GRANT.

Mr. James COLQUHOUN proposed by Mr. SUTHERLAND, seconded by Dr. O'SHAUGHNESSY.

Captain SWETENHAM proposed by Major FORBES, seconded by Mr. SUTHERLAND.

C. K. ROBISON, Esq. proposed by Major FORBES, seconded by Mr. SUTHERLAND.

Mr. Thomas Charles CADOGAN proposed by Mr. BAGSHAW, seconded by Sir H. SETON.

Mr. R. H. MATHEWS proposed by Mr. BAGSHAW, seconded by Mr. H. T. PRINSEP.

The officiating Secretary informed the meeting that the Committee of Papers propose M. RENAUD as an Honorary Member, in succession to the late illustrious M. SILVESTRE DE SACY.

Read the following letter from Professor H. H. WILSON, dated East India House, 3rd December 1839, intimating his having forwarded through Messrs. ALLEN and Co. the busts of Sir W. JONES and Mr. H. T. COLEBROOKE.

East India House, 3rd Dec. 1839.

MY DEAR SIR,—I have an opportunity of acknowledging your late, as well as your former overland letter at the same time. As the letter of the 27th August reached me this morning, just in time for to-morrow's mail, there will not be time to attend to any of its contents before the dispatch is made up, but I will make the inquiries respecting the anatomical plates without delay. There would be no difficulty in printing the work altogether in this country, and both for the sake of science and my friend MODHUSUDAN GUPTA I should willingly act as editor; he would probably, however, prefer correcting his own work.

I have recently dispatched to you, through Messrs. ALLEN and Co., the busts of SIR W. JONES and Mr. COLEBROOKE, which I doubt not will afford the Society much satisfaction. The bill remitted by you of 136*l.* has been realised, but the charge is a trifle more, being 142*l.* 10*s.* including the expense of reducing the bust of Sir W. JONES from the more colossal proportions of the statue in St. Paul's, and the expense of packing. I have paid the balance. The funds you have placed at my disposal will probably allow it to be deducted from them without inconvenience, if not, I can draw upon the Society for the amount.

Mr. JAMES PRINSEP, I am sorry to state, continues in the same condition. There is no sensible improvement, but he is not apparently worse than he was six months ago.

Yours very sincerely, H. H. WILSON.

To Dr. O'SHAUGHNESSY.

Resolved—That the amount advanced by Professor WILSON, for the purposes above mentioned, be forthwith remitted to him, with a suitable acknowledgment of the trouble he has taken in forwarding the busts.

Library.

Read a letter from the Secretary to the Royal Society of Northern Antiquaries of Copenhagen, acknowledging the receipt of two specimens of ancient warlike weapons, presented by the Society through Dr. CANTOR, and intimating his having forwarded several articles for the use of the Society.

Royal Society of Northern Antiquaries,
Copenhagen, 18th October, 1838.

DEAR SIR,—We received by Dr. CANTOR your letter of 18th October last year, together with two specimens of ancient warlike weapons of copper, for our Museum. These we consider as of importance for our collection, and we shall take a future opportunity of writing more particularly on this subject. It would be very interesting if we could obtain a few more such matters of different sorts from India. Dr. CANTOR is a good judge of northern antiquities, and knows what will be of greatest interest to us in a scientific point of view.

I take the present opportunity to inform you, that I have dispatched from our Society to yours the following articles, which I hope will arrive safely.

By Peter HANSEN, Esq. Chief of the Establishment at Serampore (8th November, 1837.)—

The Annals of the R. S. N. A. 1836-1837, &c.

By Capt. RABE, to the care of Colonel REHLING, Governor of Tranquebar (18th April, 1838, and 18th October, 1838.)—

1. My work entitled, "Antiquites Americanæ," published by our Society.
2. My Memoir, separately published in French "Sur la déconverte de l' Amérique au dixième siècle."
3. My general Chart or Map, in illustration of the voyages of discovery to America, performed by the Scandinavians.
4. My special Map of Greenland.
5. Sundry other Maps published by the Society.
6. Some facsimiles of Icelandic Vellum Codices (skinnbækr.)
7. R. K. RASK's Samlede Afhandlinger, 3 die deel.

The great importance of the literature of India to the Scandinavian north, and conversely the importance of that of the latter to India, prompts to a more intimate connexion of our Societies. I have the honor to be, Sir,

With sentiments of respect and esteem,

Your most obedient servant,

JAS. PRINSEP, Esq.
Secy. As. Soc. Bengal.

CHAS. C. RAFRY, *Secretary.* R. S. N. A.

Library.

Read a letter from J. P. GRANT, Esq. officiating Secretary to the Government of India, Revenue Department, forwarding the following Books:—

Illustrations of Indian Botany, No. 12.
Dr. WIGHT's Illustrations of Indian Plants, Nos. 11 and 12.

Read a letter from the Messrs. BOWDITCH, sons of the late Mr. N. BOWDITCH, forwarding for presentation the 4th volume of the "Mécanique Céleste, by LA PLACE," translated by their father, with a commentary.

Boston, August 18th, 1839.

SIR,—We send you, for the use of the Royal Asiatic Society, the first and last volumes of our father's commentary on the "Mécanique Céleste".

Before his death Mr. BOWDITCH prepared a few notes to the fifth volume, but they are imperfect, and therefore will not be published.

May we be allowed to refer to your notice the Appendix to the memoir of the translation, wherein you will find the disposition we have made of his library. In England our determination to make the "Bowditch Library" a free public institution, has been received with approbation by Sir JOHN HERSCHEL and others, and therefore we have taken the liberty of mentioning it to you.

We remain respectfully, yours,

N. J. BOWDITCH,
J. BOWDITCH,
F. D. BOWDITCH,
W. G. BOWDITCH,
Children of Nathaniel BOWDITCH.

To the Secretary of the Royal Asiatic Society, Calcutta.

Resolved—That the thanks of the Asiatic Society be conveyed to the Messrs. BOWDITCH, for their valuable donation; and that the Society further offer their cordial approval of the generous resolution regarding the disposal of the Bowditch Library.

Read a letter from Major JERVIS, Provisional Surveyor General, conveying a brochure by M. REINHARD.

Bombay, 10th Dec. 1839.

SIR,—On my way through France by the overland route to this country, I was charged by my distinguished friend Monsieur REINHARD, Membre de l'Institut, to present the accompanying volume in his name to the Asiatic Society of Bengal. And although not as yet a member of your distinguished body, I venture to assure you

of the very warm interest which he and many other celebrated orientalists in France, Members of the French Institute, take in every thing connected with the objects of your Society.

I have the honor to be, Sir,
Your most obedient servant,
T. B. JERVIS, *Major of Engineers,*
appointed Provisionally Surv. Gen.

To the Secy. Asiatic Society.

Read a letter to the President from M. DUTROUILLY, Treasurer of the Académie Royale de Bordeaux, presenting copies of the Actes de la Société, requesting the Journal in exchange, and inquiring after the state of Mr. Jas. PRINSEP's health.

Académie Royale des Sciences, Belles-Lettres et Arts de Bordeaux.

MONSIEUR, *Bordeaux, le 28 Aout*, 1839.

L' Académie me charge de vous adresser les deux premiers numéros de ses Actes, elle vous prie de les offrir, de sa part, à la Savante Compagnie que vous présidez, elle se fera un vrai plaisir de lui adresser régulièrement les fascicules à fur et à mesure qu'ils paroitront, elle espère que la Société Asiatique voudra bien lui continuer l'envoi de son journal.

L' Académie me charge aussi, Monsieur, de vous adresser un exemplaire de ses Actes, elle vous prie de l'agréer comme un hommage rendu à votre zèle éclairé pour les Sciences et les Lettres.

L' Académie a appris avec peine que l'honorable Monsieur PRINSEP l'un de vos Membres avait été dangereusement malade, comme elle n'a reçu aucune nouvelle de sa santé, et qu'elle à appris seulement qu'il avait été au Cap pour la retablir ; y auroit il de l'indiscretion, Monsieur, à vous prier de vouloir nous donner de ses nouvelles. Le service qu'a rendu à la science M. PRINSEP, le rend cher à tous ceux qui la cultivent, et particulièrement à l' Académie.

Veuillez, je vous prie, Monsieur, agréer et faire agréer à la Savante Société Asiatique l' assurance de la haute considération avec laqu'elle J'ai l' honneur d'être.

Monsieur,
Votre très-humble et très obéissant serviteur,
DUTROUILLY,
Trésorier de l' Académie Royale des Sciences
Belles Lettres et Arts de Bordeaux.

Resolved unanimously,—That the thanks of the Society be offered to the Académie de Bordeaux, and the Journal regularly forwarded as desired. The Secretary was further instructed to communicate to M. DUTROUILLY the latest intelligence regarding Mr. PRINSEP.

The following Books were presented :—

Outlines of the Topography and Statistics of the Southern Districts of Oudh and of the Cantonment of Sultanpore, Oudh, by Dr. D. BUTTER,——*by the Author.*

Transactions of the Royal Irish Academy, vol. 18, in 2 parts,——*by the Academy.*

Description of an Observatory established at Travandrum, by His Highness the Rajah of Travancore, by John CALDECOTT, Esq. Astronomer to His Highness, ——*by the Author.*

Annuaire des Marées des Côtes de France pour L'an 1839, publié au Dept. de la Marine. Par A. M. R. CHAYALLON.

Mémoire Sur les Divers Moyens de Se Procurer Une Base. Par A. M. R. CHAYALLON.

Nieuwe Verhandelungen der Erste Klasse, Van het Konin Glijk Nederlandische Institut, vol. 6 and 7.

Solemnia Natalitia Regis Augustissimi ac Potentissimi Frederici Wilhelmi III. ac Aug. III edited by Professor A. G. SCHLEGEL, Bonn 1839,——*by the Author.*

Mémoire sur le système Grammatical des Langues. Par M. P. et Du Ponceau, L.L.D.——*by the Author.*

The American Almanac and Repository for 1839——*by the American Philosophical Society.*

The East Indian Journal, No. 2, by R. C. WOODS, L.L.D.——*by the Author.*

A Sketch of the Argument for Christianity and against Hinduism, *(Sanscrit)* by J. MUIR, Esq. B.C.S.——*by the Author.*

Meteorological Register for December, 1839——*by the Surveyor General.*

The following books were received from the booksellers:—

Journal des Savans, for May and June, 1839.

Lardner's Cabinet Cyclopædia—History; vol. 2.

Illustrations of Ornithology, by JARDINE and SELBY, purchased from a number for Co's. Rs. 100.

Literary.

Mr. Secretary PRINSEP forwarded on the part of Government the following papers for publication in the Society's Transactions, or in its Journal:—

Dr. J. W. HELFER's third and fourth Report on Tenasserim, the surrounding nations, inhabitants—natives and foreigners, character, morals and religion.

Dr. RICHARDSON's Proceedings on his Mission to Siam and the Shan states, with a Map of Siam.

Dr. CAMPBELL's Notes on the Mechis, with a Vocabulary of their language.

The officiating Secretary apprized the Meeting of his having received from Lieut. T. HUTTON the first part of his "Journal of a trip through Kunawur, Hungrung, and Spiti," to the expenses of which the Society had contributed a sum of 1000 Rs. pursuant to the resolution passed at the Meeting held on 1st Nov. 1837, (J. A. S. vol. 6 p. 898.)

Mr. J. W. LAIDLAY forwarded a paper on Mohammedan Coins.

Museum.

The officiating Secretary then requested the attention of the Meeting to a very important dispatch recently received from the Court of Directors.—This dispatch rendered it necessary to assign 250 rupees per mensem to the salary of a Curator.—The Committee of Papers had taken the subject into their serious consideration, and their Minutes are accordingly appended to the official letter.

To W. B. O'Shaughnessy, Esq. M.D.
Officiating Secretary to the Asiatic Society.

No. 1280.

General Dept.

Letter from the Honble. Sir E. Ryan, Kt. President of the Asiatic Society, dated 21st June, 1837.
Ditto to ditto, dated 28th June, No. 261.
Ditto from Secretary Asiatic Society, 10th July.
Ditto to ditto, dated 26th ditto, No. 328.
Ditto from ditto dated 12th ditto, 1838.
Ditto to ditto, dated 18th ditto, No. 844.
(Para: 81 to 87)

Sir,—With reference to the correspondence noted in the margin, I am directed to transmit to you, for the information and guidance of the Society, the accompanying Extract from letter No. 17, of 1839, from the Honorable the Court of Directors, in the Public Department, dated 18th September.

I am, Sir,
Your most obedient servant,
H. T. PRINSEP,
Secy. to Govt. of India.

Council Chamber,
26th December, 1839.

Extract from letter No. 17 of 1839, from the Honorable the Court of Directors in the Public Department, dated the 18th September.

Applications from the Asiatic Society of Calcutta to the Government for assistance.

Letter of 30th Aug. 1837.

Forwarding correspondence with Sir Edward Ryan, the President of the Society, soliciting the aid of Government to the amount of rupees 200 per mensem, in maintaining the museum of antiquities and natural history already commenced by the Society, but which must fail without such aid; also requesting permission to purchase antiquities, manuscripts, and objects of natural history and science to the extent of rupees 800 per mensem, on the engagement that the objects shall be placed at the disposal of the Government if the Court should decline to sanction the measure. The subscription of rupees 200 per mensem was sanctioned, and it was intimated, with regard to the latter application, that the Government declined a fixed grant, but would be ready to receive recommendations for the purchase of objects of more than common interest.

Letter of 12th Sept. 1838.

Reporting that the Government had acceded to the application of the Society by giving retrospec-

Para. 81. Your letter of the 30th August, 1837, forwards an application from the Asiatic Society of Calcutta soliciting the aid of the Government for the extension and maintenance of their Library and Museum, submitted to you with a letter from Sir E. Ryan, the President of the Society.

82. The objects of the Society, as set forth in their resolution of the 7th June, 1837, and their President's address, are the means of providing for the services of a professional naturalist to superintend and systematize their collections—of defraying the cost of preserving—of displaying the collections of curious and instructive articles already made—and of procuring additional objects illustrative of the geography, antiquities, statistics, mineralogy, conchology, botany, and natural history of India. In order to accomplish these purposes they estimate that in addition to their own available resources, an annual expenditure of 10,000 rupees is necessary. Although however specifying this sum as the amount of the aid which they are desirous of receiving, they leave it to you to fix the extent of any grant which you may deem it expedient to afford.

83. In your reply to the President of the Society you acknowledge the claims of the Asiatic Society of Bengal to the gratitude of the public, both in Asia and in Europe, for the persevering and successful efforts it has made, for more than half a century, to investigate and illustrate the literature, science, and natural and artificial productions of the East. You recognize the advantages which may

tive effect to the monthly allowance of rupees 500 granted by the Court for the publication of oriental works, as the Society had published several works before the receipt of the Court's sanction, and had thereby incurred a debt of rupees 2,500.

be expected to result from the extension of the Society's Library and Museum, and you admit the impossibility of this extension being effected, unless the Society be aided liberally by the Government, in like manner as similar institutions in Europe are supported by the Public Treasury. At the same time you declare yourselves precluded from giving an immediate sanction to the specific annual grant suggested by the Society in this instance, without previous reference being made to us, engaging to support such reference with your recommendation.

84. In a subsequent address from the Society, dated 10th July 1837, you were solicited, pending the result of the reference to us, to assist the Society with a monthly grant of 200 rupees, and a further sum of 800 rupees, a month, for the purchase of additions to the Library and Museum, on the condition that if the disbursement should be disapproved of, the articles so purchased should be relinquished to the Government. With the first of these requests you complied, but declined to make any specific appropriation of funds for the objects proposed in the latter suggestion, although you stated your willingness to receive from the Society recommendations for the purchase, or other procurement, of such articles as the Society might think it desirable to possess, and provided they were not of a perishable description.

85. The independent and useful activity of the Asiatic Society of Bengal during so long a period, entitles it justly to your consideration, and looking to it as the only institution in India, which offers any analogy to the great national libraries and museums of Europe, it is a legitimate object of public support. We therefore approve of the aid and encouragement which you have given. We think, however, that the extent to which you have gone is fully adequate to all purposes of public utility. The Society is already in possession of a library and museum of some extent, and the additions that may be made to either must be occasional and progressive. It does not happen in India as in Europe, that large public or private collections of a rare and valuable description are offered for sale, and all accessions which the Society will have an opportunity of acquiring must be of limited extent and incidental occurrence. From the character too of the persons who are likely to contribute to the Society's collections, it is very improbable that a pecuniary equivalent will in all cases be desired, and it seems to us, on various grounds, unnecessary and objectionable to assign to the Society a permanent grant for the purpose of effecting occasional purchases. When an application from the Society comes before you for any definite outlay, it will be time enough to take into consideration the expediency of granting the particular assistance that may then be required. We shall not object to your granting to the Society funds for special purchases, as occasions arise, as far as may be compatible with a due regard to public economy. On all such occasions, you will forward to our Museum a selection from the articles which may have been so procured.

86. The more immediate and permanent want of the Society is the superintendence of a qualified person to preserve its collections, and arrange them in a scientific and systematic manner, so that they may be readily consulted, and be at all times subservient to the diffusion of useful knowledge; such a person may no doubt be met with at the Presidency, and we do not object to your allowing to the Society the monthly sum of 200 or 250 rupees as the salary for his services, with a further sum of 50 rupees a month for the cost of preparing specimens, and maintaining the

collections in order. It would however be an unprofitable waste of money to attempt the preservation of many of the objects of natural history in the climate of Bengal, and these when considered valuable should be transmitted to our Museum.

87. We do not object to the retrospective effect given to the appropriation of 500 rupees a month for the publication of oriental books, under the circumstances stated; and we take this opportunity of intimating our wish, that as soon as the work in hand shall have been completed, arrangements should be adopted for applying the grant to the printing of the text of the Vedas, with a commentary, as the oldest and most authentic record of the language and religion of the Hindus, and therefore indispensable to the history of opinion and of man.

(True Extract) H. T. PRINSEP,
Secretary to the Government of India.

Minute by Sir EDWARD RYAN.

It appears from the copy of the dispatch of the Court of Directors, communicated to the Society by the direction of Government, that 200 or 250 rupees are to be allowed monthly to the Society for the salary of a qualified person to preserve its collections, and arrange them in a scientific and systematic manner, and an additional 50 rupees a month for the cost of preparing specimens, and maintaining the collections in order. I think it is desirable that the Society should state the time they will require any Curator they may appoint to devote to his charge, and the periods at which he should report to the Society upon the state and condition of their Museum. I think upon the fixed salary that will now be devoted to the person, that the Society might reasonably expect two or three hours in each day shall be devoted to the Museum—that reports should be made at each monthly Meeting—and the office of Curator should be held, like most of the offices of the Societies, for the year only; that is, subject to annual re-election. If the Society approves of the conditions there named, I would further propose, that the office of Curator be offered, in the first instance, to Dr. M'CLELLAND, who has so kindly, for some time past, discharged the duties of Curator without salary. If he will accept, the office, I am sure the Society will be happy to avail itself of his most valuable services. I beg our Secretary to circulate with Mr. Secretary Prinsep's letter and enclosure this memorandum.

EDWARD RYAN.

January 25th 1840.

Circular from officiating Secretary, to the Committee of Papers, Asiatic Society.

GENTLEMEN,

I beg leave to circulate an important dispatch from the Honorable the Court of Directors, regarding our Museum, and directing a salary of 250 rupees per mensem to be paid to the Curator. I also circulate a Minute on the subject by our President.

I take the liberty of expressing my concurrence in the opinions of the President, and at the same time my hope, that Dr. M'CLELLAND may be enabled to command sufficient leisure for the duties of the office. It is quite impossible at present to find a competent and available individual to fill Dr. M'CLELLAND's place. The accomplished officers who have recently entered the service (I allude chiefly to Drs. WALKER, JAMESON, and CANTOR) are too eagerly sought for by the Government for scientific missionary duties to justify our indulging the least hope of their being soon placed in Calcutta.

I am satisfied, at the same time, that should Dr. M'Clelland feel his time pre-occupied to such an extent as to prevent his attending closely to the Museum, he would be the first to propose measures for the securing the entire services of a competent person. I think with the good salary we are now enabled to offer, that we can very easily procure such an individual from England. I accordingly propose,—

1. That in the event of Dr. M'Clelland declining the curatorship on the terms allowed by the Honorable Court, and under the stipulations of our President, the Committee of Papers address (through the President) an application to the proper scientific personages at home, requesting their selection and appointment of a competent naturalist for the office of Curator on a salary of 300*l.* per annum.

2. That the Committee of Papers at the same time forward a memorandum of the Curator's duties.

3. That the person appointed in England be bound to serve the Society for five years.

4. That an outfit allowance of five hundred rupees be allowed him, and his passage paid for, and that the necessary funds for these expenses be provided by allowing the Honorable Court's monthly donations to accumulate from the date on which these resolutions may be agreed to, until the arrival of the Curator.

5. Lastly, that these resolutions be submitted to the consideration of the next general meeting, with the recommendation of the Committee in their favor.

Your's faithfully,

26th January, 1840. W. B. O'SHAUGHNESSY.

Minute by Dr. M'Clelland.

Having fully considered the responsibilities of the office of Curator, I shall be happy to continue to discharge its duties, if it be desirable to the Society I should do so.

As the Museum of Natural History at the India House is alluded to in the Court's dispatch, I take the liberty of putting into the circular a letter from Dr. Horsfield, the superintendent of that collection, by which it will be seen that the Court of Directors are promoting at the India House the very same object that we have here in view, in endeavouring to establish a collection of natural objects.

Under these circumstances, it will no doubt be agreeable both to the objects and wishes of the Asiatic Society, to promote as much as possible, without detriment to our own Museum, the objects of the home collection, with which view the grant of 200 to 250 rupees as salary to a Curator, seems partly to have been made.

In my opinion the great, and indeed the only security the Society can possess in regard to a Curator, is scientific reputation; for without acquirements of a high order as a naturalist, (by which I do not mean a stuffer, nor the mere namer of objects) his assiduity would be of no avail, while his monthly reports, were he to engage to supply them, might bring discredit on the Society.

It is for these reasons, and because of a want of confidence in my fitness for an office so interesting and important as our curatorship is now likely to become, that I cannot enter into any engagements as to periodical reports, or hours of attendance.

We may at present have few in Calcutta qualified for the office, but of the number of eminently qualified individuals who have recently entered the Medical Department, we may hope that ere long the services of some of them will be required in Calcutta,

when our Museum will have the aid of curators of far higher qualifications than the Society could obtain from Europe for any small sum we can ever hope to be able to offer.

29th January, 1840. J. M'CLELLAND.

P. S.—I was afraid that in sending home for a Curator it might be forgotten that we have eminently qualified persons in India, and am therefore the better pleased to find that since my remarks were circulated, the names of three to whom I particularly alluded, have been incorporated in the Secretary's Minute. I am however, very sanguine as to soon seeing several qualified scientific men in Calcutta, for offices of this nature.

J. M'CLELLAND.

Minute by Mr. H. T. PRINSEP.

I wish to see this question fairly discussed at the meeting on Wednesday next. I see no other arrangement that can be proposed, except to place Dr. M'CLELLAND in the office for the coming year; but I think unless he will pledge himself to daily attendance, and monthly reports, that he should be considered, as he himself suggests, as officiating until we can find a qualified person who will give more time to it.

I think with him, that it will be preferable to look out for a Curator amongst the highly qualified persons we have in India, rather than take the chance of obtaining a good man from England. 300*l.* per annum, or 250 per mensem, is not enough to satisfy a man of science. Indents for Editors, and even for Schoolmasters, from Europe have not ordinarily been successful.

H. T. PRINSEP,
D. STEWART,
W. N. FORBES,
D. McLEOD.

30th January, 1840.

On the day of the meeting Dr. M'CLELLAND *submitted the following additional Minute.*

As the Museum at the India House is alluded to in the dispatch of the Honorable the Court of Directors, No. 17 of 1839, dated the 18th September, the following remarks on that collection is extracted from a private letter addressed by Dr. HORSFIELD to Mr. M'CLELLAND, Bengal Medical Service, dated Library, East India House, August 31st, 1839.

"The Museum itself is not very extensive, but it is nevertheless of much importance in connexion with Indian zoology, as it contains several extensive local collections.

"It consists mainly of the following Faunas, which are more or less perfect:—

"*Firstly.* A collection of upwards of 200 species of birds from Java, and a proportional number of quadrupeds. This was formed by myself, and brought to England in 1819, when it constituted the nucleus of our Zoological collection.

"*Secondly.* We have a pretty complete series of Birds collected in Sumatra by Sir STAMFORD RAFFLES, and some of his Mammalia.

"*Thirdly.* We have a similar collection made by the late Dr. FINLAYSON in Siam and in the Indian Archipelago.

"*Fourthly.* We have a nearly complete series of Mammalia and Birds collected by Colonel SYKES in the Dekun, of the importance and extent of which you can judge by the respective catalogues contained in the Proceedings of the Zoological Society for 1831 and 1832.

"*Fifthly.* We have a few specimens from China, Nepal, and the Upper Provinces of Bengal, but these are imperfect and fragmentary.

"To these has now been added a series, almost complete, of the Mammalia and Birds collected by yourself in Assam, which have been mounted, and form a valuable addition to the specimens exhibited in our Museum.

"All these separate Faunas are neatly arranged in our natural history department, which consists of a large room well lighted, and provided with excellent cabinets for the preservation of the subjects.

"This Museum I may say is established on a modest scale, and without the pretension to extent or elegance of the national collections (such as the British or Hunterian, or even the Zoological Societies) but our specimens are generally good, being prepared by the best London artists, and my endeavour is to have them correctly labelled.

"Our collection consists mainly of Quadrupeds and Birds; but we have also a small collection of Fishes, Reptiles, and Serpents, which have recently been examined by Dr. CANTOR, who has prepared a list of them, agreeably to which they are arranged.

"It is my intention as soon as possible to prepare a general list of the Mammalia and Birds which are arranged in our Museum for transmission to you, so that you may form an accurate idea of what we have, and be enabled to judge of what we want.

"I have no doubt the nature and importance of natural history is more considered and appreciated now, than it was in former times; and I cherish the hope that the countenance and support of Government will ere long be extended to it in an effectual way; but this I can at present only allude to as a wish or expectation. Meanwhile I may enumerate some of the subjects which would be particularly desirable. We want, for instance, many of the birds of Bengal. All the rarer species, and some of the more common (of these I hope soon to send you a provisional list); we want generally the Birds of Silhet, the Garrow Hills, Tenasserim, Arracan, Burmah, &c. &c. and duplicates of the new and of all the rarer species discovered by you in Assam.

"We want a complete series of the Birds of Nepal, also Mammalia; the smaller species would suit our purpose best, as we can more easily accommodate them. But above all, and especially, we want a large, full, and complete collection of all the *Vespertilionidæ*, or *Bats* of India. This is the most important family, as it has never been sought after; and I beg and entreat you to have a large collection made generally throughout all India; and I need not point out to you the localities where these animals are most likely to be met with"

Here Dr. HORSFIELD enters into particulars regarding the genera and species.

"But besides these it is in the branch of *Entomology* that I would at present strongly solicit contributions to the Company's Museum. I am more anxious on this head, as I have succeeded in bringing an extensive collection of Insects from Java in excellent condition, and with the exception of these, and the collection of Colonel SYKES, we have absolutely nothing from Bengal or from India generally." On this subject Dr. HORSFIELD delicately alludes to the probability of gentlemen connected with

missions still holding collections of Insects unappropriated, under the supposition, perhaps, that such objects would be less appreciated than the large animals; on the contrary, Dr. HORSFIELD states that contributions to this department of the Museum would be as likely as any other means to promote the interests of science, and to secure the approval of those who are interested in the collection at the India House.

With regard to Insects. The public collections which remain, I believe, unappropriated, are those made by Dr. WALLICH, Mr. GRIFFITH, and myself, when employed on the Assam deputation, and Dr. HELFER'S collection. That which was made by the Assam deputation is still, I believe, at the Botanic Garden, and like Dr. HELFER'S collection has not yet been transferred to the Government. With regard to the former, perhaps the Society has no authority to interfere; but as the Society has been authorized to take one series of Dr. HELFER'S collection for our own Museum, and to select another for that of the India House, it might be necessary to address Dr. HELFER on the subject, particularly as his collection of birds for the Honorable Court has been packed up for some time in the Museum, and are only detained till the insects which have not yet been submitted to the Society should accompany them.

The large collections of birds and insects made by Captain PEMBERTON during his mission to Boutan, and the officers who accompanied him on that occasion, have been long almost unobserved in the Museum, owing to the late repairs of the house. The greater part of the birds composing that collection were previously in our possession, bu tsuch as were new to it were transferred to our cabinets, and the rest enclosed in cases for transmission to the India House. The insects of the same collection which are numerous, and no doubt rich in undescribed forms, are also in course of being dispatched with the birds; a series having been reserved for our own collection. The pains taken during Captain PEMBERTON'S Journey, to mark the localities in which the different objects were collected, cannot be too highly applauded, especially as this very important circumstance has been hitherto altogether neglected on such occasions.

Mr. LYELL in a letter addressed to Mr. M'CLELLAND, dated 7th September 1839, states, that he is very anxious for accurate information respecting the geography of living *testacea* and Indian *tertiary* shells, and if furnished with duplicates from the Museum of the Asiatic Society, proposes in return to supply the Society with fossil and recent shells in exchange.

The Society, it is to be regretted, has few fossil shells from Indian beds, and a very imperfect collection of recent species. Indeed the little attention that has been paid to these important subjects in India, seems to have induced collectors to send their contributions elsewhere. Several members, and others interested in the advancement of science, are most favourably placed on the Malay coast, at various points from Chittagong to Mergui, and we may look, I trust, with confidence for large collections from this quarter in the peculiar department alluded to. I have myself been already indebted for a miscellaneous collection of shells from Dr. HELFER, and slight contributions have been made to our Museum from time to time by different individuals; but I question if we have as yet a tenth part of the species of the Bay, while we are altogether without the corals, polypes, and radiata, so abundant in all the Eastern seas.

Mr. A. P. PHAYRE, assistant to the commissioner of Arracan, kindly sent me some time since a few interesting specimens of the rocks in the vicinity of Akyab, which are perforated to the height of six feet above the greatest elevation of spring tides, the same as beneath the level of the water, by a species of *Pholas*. Mr. PHAYRE justly

ascribes this to a change of level in the rocks composing this part of the coast, and regards the perforations as identical to those which have been observed in the sandstone at Cherra Ponji. With regard to the Cherra Ponji rocks, I am indebted to Mr. H. WALKER for an observation of very great importance when observing the number of *Echinidæ* in my collection from that quarter; he suggested the probability of the elongated moulds contained in what seemed to be perforations, being nothing more than the spines of a *Cidaris*, a species of *Echinus*. On this subject, as well as the *Echinidæ* generally, which I find to be very abundant in the Cherra beds, I hope soon to have a communication to make, being now employed in an examination of the Indian species, particularly those which I have found fossil.

These departments of the animal kingdom are of the more importance to our collections, as we can hardly advance a single step in geology until our cabinets are complete, or nearly so, in recent species.

Mr. PHAYRE has liberally undertaken to collect for us at Akyab, but we require equally zealous correspondents at Chittagong, Kyuk Phyu, Sandoway, Moulmein, Mergue, and at all the different stations along the coast, before our Museum can be considered in a progressive state.

With regard to fossil species, our collection is equally defective; indeed so long as we are without a complete collection of recent shells, fossil species would be of little interest in our Museum. As a proof of the poverty of our collection, I may remark, that of one striking and numerous family, affording probably some hundred species, most of them found in the Indian seas, yet *two* species only are all we have in our Museum, and these from unknown localities, probably New South Wales.

As animals of this family have been found in a fossil state, in a bed of sand, reposing beneath the common soil of the Sylhet mountains, under circumstances which we are bound to investigate, the fact may induce those who reside along the coasts above alluded to, to contribute their share towards the inquiry by forwarding specimens of them to our Museum. The dried testa of *Echinida*, called *sea-eggs*, are very abundant, I understand from Captain BROWN, on the shores of Rambree Island, and all the islands from thence to the Straits, while the living animals usually named sea-hedgehogs, from the number of spines with which they are covered, may be had from rocks in the same vicinity. The bleacher shell is seldom perfect, so that the living animals when put fresh into spirits form the more valuable specimens; but from the ease with which the former may be collected and preserved, as well as from their beauty as mere ornaments, they ought to form a portion of every collection, and from the philosophical interest of the subject they would be a welcome addition to our Museum.

Enough I trust has been said to induce residents on the Malay coast and other situations where similar facilities are afforded, to enable the Society to avail itself of the offer of Mr. LYELL, and at the same time to enlarge, or rather form its own collections of Indian species.

The interest now awakening in Europe regarding the natural history of this country, is calculated to produce a more powerful effect in exciting a spirit of inquiry here, than any arguments that could be urged on the spot. Thus, we have not only a Museum at the India House, now opened for the exhibitions of animals collected in India, but the first philosophers are ready to co-operate with us and aid our inquiries.

In addition to the instances of this kind already referred to, Mr. E. CHARLESWORTH and Mr. S. V. WOOD have each presented us with collections of tertiary shells,

to facilitate our examination of the Cherra fossils. With a similar view Professor REINHARDT has presented the Society (through the medium of Dr. CANTOR, by whom they have been safely conveyed from Denmark to our Museum free of expense) with the valuable collection of skulls of *Cetacea* from Greenland, now on the table, to facilitate the examination of the fossil Mammalia that abound in several districts of India.

We cannot however flatter ourselves that any results we have yet attained are such as to entitle us to the aid of naturalists in Europe. I therefore refer the interest which the above marks of attention betoken in favor of our scientific movements, to the personal influence of one of our members, Dr. CANTOR, who has recently returned from Europe, where he met a reception for his labors among us, from philosophers of every rank, of which he may well be proud, and which cannot fail to produce a powerful effect on his future career in India.

Our scientific progress will however depend so much on the cultivation of a general intercourse with scientific individuals and Societies in other parts of the world, that we ought to take advantage of the occasion by meeting the views of those who are desirous of exchanging collections with us.

Indeed to attempt to establish a national Museum in India without this kind of co-operation, would be to reject what has been done in Europe, and to begin the study of the physical sciences as if nothing had been accomplished beyond the few scattered publications that reach India. It is by cultivating an interchange with other Museums, and thus introducing the known species of other countries as the standard of comparison for the elucidation of the unknown species of this, that we are to advance our own collections, and contribute most effectually to the general diffusion of knowledge, and the progress of science.

5th February, 1840. J. M'CLELLAND.

Dr. M'CLELLAND then rose and addressed the meeting regarding the attendance of the curator for two hours a day, and a monthly report on the Museum, as insisted upon in the minute of the President, which he objected to. He objected to any stipulated period of daily attendance beyond what might be necessary to superintend the persons employed in the Museum, and of this the curator himself should be supposed the best judge. He has been in the habit of devoting more time than two hours, he might say even five hours, daily to the duties of the Museum, but that was at his own house, where he had painters and other facilities which the Museum did not afford, and where he would continue to employ himself pretty much in the same way whether appointed curator or not. As to reports, he also thought these should be left to the discretion of the curator, as it would be useless reporting unless there should happen to be something of interest to report about.

SIR EDWARD RYAN said, that he thought Dr. M'CLELLAND did not quite understand him by two hours a day; he did not mean that two hours should be given every day, but that if he could not give one, four hours could be devoted to it the next, and so on, only that on an average two hours daily, whether at home or at the Museum, should be required by the Society from the curator.

As to monthly reports, it was not absolutely necessary that a long report should be furnished every month; for some months there might not be any thing to report, when only a letter stating this circumstance would be all that would be required. Monthly reports were only necessary as public records for future reference for a history of the Museum, and also that they might have something which they could produce if called

on by the Government for the expenditure of the sum granted by the Honorable Court for this express purpose. He therefore begged to propose that the office be offered to Dr. M'CLELLAND on these stipulations, if he chose to accept of it.

Mr. H. T. PRINSEP thought it necessary to inquire, with reference to Dr. M'CLELLAND's explanation of his views of the nature of a curator's office, whether it was intended to recognize the curator as entitled to remove to his own house any objects of natural curiosity or other articles he might desire. He thought that the recognition of such a privilege was inconsistent with the object of preserving always at hand for inspection every article obtained. He wished the rules of other Museums should be referred to, for of course it would be expected now that the Honorable Court had specifically assigned a sum for its maintenance, that the Society should conform to the practice of other similar institutions in Europe. Of course on the first arrival of any article, before it was classed and located in the Museum, the curator might do whatever was necessary to examine and test it, carrying it away if he pleased for the purpose. But when once placed in the Museum, Mr. PRINSEP thought the articles ought not on any account to be removed, and the rooms of the Society afforded facilities sufficient for copying and comparing in them, without any removal being necessary.

Sir E. RYAN then moved that the Committee of Papers be instructed to draw up rules on which the curatorship should be held, with the stipulation that two hours a day at least be allotted for the duties of the office—that reports be furnished monthly of the state of the Museum—and that no specimens be allowed to be removed from the Society's apartments. Similar rules in fact have invariably been observed by other Societies. The President further suggested, that the Committee do make their report on it at the next meeting. Dr. M'CLELLAND then said, that if it was intended that these rules should be strictly enforced, it would be the means of greatly limiting the endeavours of the curator, whoever he might be, for the interests of the Society; and he thought it as well, under these stipulations, to decline accepting of the situation.

Sir E. RYAN added that the Society were so sensible of the value of Dr. M'CLELLAND'S services, that no decision would be formed on his expressed refusal of the office until the next meeting.

The annual Report was then presented by the officiating Secretaries, but reserved for perusal at the next meeting.

The following letters from Dr. CANTOR were read.

Calcutta, January 25, 1840.

SIR,

I take the liberty to call your attention to the following extract of a letter which I have received from Prof. REINHARDT, Superintendent of the Royal Museum at Copenhagen.

"In the year 1823 or 1824, I presented a number of stuffed specimens of European, (mostly northern) birds to the Asiatic Society, Calcutta. From a Calcutta Journal I have learned, that the specimens had arrived in fine condition, and that the Society at their monthly meeting were pleased to pass a resolution, that a number of their duplicates of Indian birds were to be presented to me in return. I have however since then neither heard any thing concerning this matter, nor have I received the gift of the Society. If you therefore on your return to Calcutta could procure some informa-

tion as to what course has been pursued after the Society had passed the resolution, I shall feel much obliged."*

I beg leave to request that you will favour me with such information upon the subject as shall enable me to comply with the request of Professor REINHARDT.

I have the honor to be, Sir,
Your most obedient servant,
THEODORE CANTOR.

To the Curator, Asiatic Society's Museum.

SIR, *Calcutta, January* 25, 1840.

In a letter from the Secretary, bearing the date of October 31st, 1837, Mr. JAS. PRINSEP expressed the Society's wish, that on my arrival in England I should purchase such works upon natural history for the Society as were most wanted in their library. To the number of works upon natural history which I have ordered Messrs. ALLEN and Co. to procure and dispatch to the Society, I beg to add the accompanying work upon *Infusoria*, by Professor EHRENBERG.

In the above mentioned letter, the Secretary further requested me to take charge of two duplicates from the Society's Museum, viz. a skull of an elephant, and a ditto of a rhinoceros, with a view to procure in exchange for those objects others, which from the knowledge I had obtained by arranging and making a catalogue of the Museum, I should conceive to be acceptable.

From Professor REINHARDT, Superintendent of the Royal Museum at Copenhagen, I have received in exchange the accompanying series of osteological preparations, which with the annexed list I have the honor of laying before the Society. The collection consists chiefly of northern Cetacea, a class of animals, which, from their locality, belong to the rarer objects in the European Museums, and which I conceive of double interest to our Museum, as affording means of comparison to students of the fossil Cetacea found in the Himalayan beds.

I have the honor to be, Sir,
Your most obedient servant,
THEODORE CANTOR.

List of osteological preparations received from the Royal Museum at Copenhagen, in exchange for two skulls from the Asiatic Society's Museum.

No. 1. Canis lagopus,
" 2. Ursus maritimus,
" 3. Phoca hispida ♂ Adult,
" 4. Phoca grœnlandica ♂ Old,
" 5. Ditto .... ♀ Adult,
" 6. Phoca vitulina ♂ Old,
" 7. Ditto .... ♂ Young,
" 8. Phoca barbata ♀ Adult,
" 9. Cystiphora (Phoca) cristata ♂ Old,

* *Note by the Curator.* The articles intended by the Society for Professor Reinhardt were made over to Dr. Wallich, I believe, who undertook to have them conveyed to Copenhagen.

,, 10. Ditto .... ♀ Old,
,, 11. Ditto .... ♂ Young,
,, 12. Ditto .... (6 months old,)
,, 13. Trichechus rosmarus. Adult,
,, 14 Ditto .... Young,
,, 15. Delphinus phocœna, Adult,
,, 16. Ditto .... Young
,, 17. Delphinus globiceps, Old,
,, 18, Delphinus (Delphinopterus) albicans.

The specimens were procured in Greenland.

THEODORE CANTOR.

To the Curator, Asiatic Society's Museum.

We have been obliged to forego our intention of publishing Colonel Luard's *admirable sketch of the explosion of the "Equitable," it being quite impossible in Calcutta to communicate its effect by a stone drawing.*—Eds.

Extent of Tenasserim.—The Tenasserim Provinces consist of a part of Martaban (now Province Amherst, formerly belonging to Pegu) and the districts of Ye, Tavoy, Mergui, and Tenasserim.

Motives for occupying Tenasserim.—There seems to have been no secondary motive for retaining these provinces, beyond their affording facilities to command the bay of Bengal; they could not have then held out any other apparent, known allurement.

Present relations with Burmah.—The misapplied generosity of the British, left their Burmah foes in possession of the most productive and important part of the empire. This generosity has been misconstrued into weakness, or inability to retain the conquest; which prevailing opinion has acquired greater strength since the usurpation of the present ruler, and this opinion, strengthened by the peaceable policy of the British Indian Government in this quarter, is the reason of the insolence of the present ruler of Burmah.

Formerly prevailing opinion of the Burmah power.—Formerly when all intercourse with Burmah was either cut off entirely to Europeans, or when the notices of the embassies of the British government sent to Ava could be but imperfect, on account of their always proceeding the same way by water, up the Irrawaddy to the capital, the power and population, the resources and abilities of this empire were greatly exaggerated.

Now corrected.—Since that time, our knowledge of it has greatly increased; the war laid the lower country open to investigation; and since the conclusion of the treaty of Yandaboo, several able British gentlemen have traversed the empire in different directions, and the conclusion drawn from personal experience has been, that Burmah could only rank in political importance with second rate Indian powers. It was found out, that the population formerly estimated at 17 millions of inhabitants, could not be reckoned at more than 3 or 4 millions scattered over a wide extent of country—that part of the population was tributary to the ruler—that, if that prince, be inclined to hostilities, he can but raise a kind of temporary militia, not exceeding at the utmost, 70 or 80,000 men—that a permanent disciplined soldiery does not exist—that great part of this militia must be in a sad plight after a few months' campaign, placed opposite a disciplined army, commanded by Europeans, on account of want of ammunition, clothing, food, &c. &c.—that most of these men are peasants, driven from their homes by force to fight the enemy—that few of them know even to handle their arms—and that none of them are able to fight a British Indian army in the open field.

Erroneous opinions of the people.—In the same manner in which the abilities of the ruling power were misrepresented, an erroneous opinion was also formed of the character of the inhabitants.

Equally corrected.—Instead of finding the mass of the population *brute warriors*, they are in fact a harmless, naturally mild race of husbandmen, oppressed by a highly tyrannical absolutism.

Reasons of their military excursions.—The love of sudden gain, and that (to every nation) inordinate desire after adventures, carried them, under the lead of ambitious men in power, from time to time to invasions of surrounding states, and rendered them chiefly under the founder of the present dynasty, Alompra, in the last century, a conquering nation. Yet they were destitute of the roaming ferocity of the Tartars, or the bloody propensity of the Arabs, and of the personal courage of both. The mass engaged in such expeditions, after a few months devastation and plundering, returned to their homes to labour in the fields; and a small part of them continued robbers even in their own country, often not discouraged by their own government, perhaps, with a view of conserving in them the stock and spirit of soldiery, useful for future enterprizes.

An exaggerated military reputation.—The dread of surrounding, unsettled, petty nations, the never decided superiority between them and the Siamese, their succeeding even in defeating a Chinese army, nurtured in them a persuasion of their invincibility; the boasting of their blinded adulating courtiers, the ignorance of the true state of the country—a *terra incognita* to Europeans—all this contributed to create a high opinion of their power, and consequently an erroneous belief of danger to British India, until their own signal defeat in the last war, followed by the first dismemberment of their empire, destroyed this delusion.

Other neighbours.—Shans.—The neighbours to the north, the tributary Shan states of Zimmay, Laboung, and Yaihaing, are equally an agricultural race of people, the nature of their mountainous sub-alpine country induces them also to partly follow the pursuits of pastoral tribes. They appear to be weak clans, and profess to detest the Burmese, but are too insignificant to become independent; they have hitherto manifested a spirit of amity towards the British, and have shewn themselves anxious to be allowed to throw themselves under their protection.

Siamese.—The kingdom of Siam, fronting the Tenasserim provinces towards the east, is established upon the same foundations which are in these parts universally acknowledged and adopted. The government

is likewise an uncontrolled, sometimes very rigorous, absolutism; yet it appears Siam is advanced one step farther in civilization than Burmah, for its ruler not only protects agriculture, but encourages commerce; its inhabitants are undoubtedly more industrious, and in consequence, their country more wealthy. The fertility of the great valley and of the plains formed by the delta of the Meram river, is highly spoken of. The great number of Chinese settled amongst them has doubtless contributed to establish a more general and improved cultivation. The custom prevailing to this day of driving the population of whole districts, when conquered, to remote parts; forcing them to cultivate the ground, though in itself for the depopulated countries highly pernicious, seems to indicate that the government knows duly to appreciate the value of the labour of husbandmen. Though no positive data of the whole amount of the revenue are known, yet it must be, judging only from the duties levied at Bankouk, at least double that of the Burman empire.

The feelings of the court of Bankouk, manifested towards the British Government of India, have been hitherto those of amity and good-will. These feelings are dictated partly by apprehension for their own safety, partly by their hereditary enmity towards the Burmese; they viewing the British as the natural enemies of that nation. The Burmese and Siamese have been for a long time rivals, and in consequence, never friends. The weakening the Burmese gave additional strength to the Siamese. Before the British war with Burmah, neither of the two powers, though almost uninterruptedly engaged in petty warfare, could subdue the other; their military force and prowess being equal.

Their mode of warfare was confined in latter times to temporary invasions, accompanied by mutual devastations, generally to both parties equally injurious. The consequence was, that the confines of the two powers have been rendered a waste, and hence it is accounted for that the frontiers of the Tenasserim provinces towards Siam are totally uninhabited, desolate, uninterrupted forests, from thirty to eighty miles in breadth.

It appears from the late accounts of Dr. Richardson, that the high opinion which the court of Bankouk had conceived of the British power, and which they knew only to measure by the progress of British arms in the last war, has somewhat diminished, within the last two years. With the returning belief of their own strength, and diminishing apprehension of their new neighbours, the feelings of amity, and the desire of mutual peace, will be lessened.

The Siamo-Malays.—The Siamese are conquerors in the Malay peninsula. The petty states to the south of the Tenasserim provinces (whose boundary is formed by the Packchan river disemboguing in lat. 9° 57′) are under Siamese dominion. The races inhabiting it are mixed. Those in the neighbourhood of the Tenasserim provinces are either Siamese, or formerly captured Burmese, or people from the eastern frontier of Siam, besides others forcibly transplanted from other parts. The people lower down the peninsula are half Siamese and half Malays; and nearer to the extremity of the peninsula, of pure Malay origin. It seems that the Siamese government exercises in these provinces a much more severe absolutism than within the proper limits of Siam, and consequently it is proportionably more hated.

Malays.—The Tenasserim provinces have no intermediate intercourse with the Malays, except with some few people of this race, who have farmed the edible birds' nest caves in the Mergui archipelago, from government.

Nicobarians.—The people of the Nicobars, apparently the offspring of a mixture of surrounding nations, wrecked or dispersed accidentally on the islands, are totally insignificant in a political point of view.

There exist some relations between the Burmese of the Tenasserim provinces and these islanders, with whom a trade of exchange is carried on. The Nicobarians furnish ship loads of cocoanuts which they barter with the Burmese for cloth, tobacco, iron, and earthenware. They must be called independent at present, for though the Danes endeavoured repeatedly to take possession of some of the islands, at present not a vestige is to be found either of their establishment or of their authority.

Andamanese.—To finish the enumeration of the nations bordering on the Tenasserim provinces, mention must be made of the Andamanese, perhaps the lowest beings in the scale of civilization belonging to the human species. They are of the negro variety with woolly curly hair, of a diminutive stature, almost untameable, even when caught young, living upon trees, or under a shed of pealed bark, or in the crevices of mountains, subsisting upon the spontaneous produce of nature; their chief food consists of shell-fish, collected on the sea-shore. They are reported to be cannibals. No nation has yet succeeded in forming a friendly alliance with them, they considering every stranger an enemy, whom if it be practicable they kill, and in retaliation are destroyed by every stranger without compunction, whenever accident brings them in contact.

The interior of these large and interesting islands is entirely unexplored. The sea-shore is visited by the Burmese inhabitants of Tenasserim and the Malays, for the purpose of collecting sea-slugs, and edible birds' nests. These occasional visitors have no intercourse with the savage inhabitants, and live during the season of collection either in their boats, or build a sort of temporary stockade for their defence.

Notwithstanding the favourable situation of these islands in the bay of Bengal, notwithstanding the beautiful harbour of Port Cornwallis, the attempt to form an establishment there, made several times by the English for the sake of a military and commercial depôt, has been given up entirely.

The Dutch.—The Dutch is the only European power which has possessions in the post-Asiatic countries, besides the British (if the Philippine islands be excepted.) However not only their vicinity, but even their very existence is unknown to the people of Tenasserim; there is no intercourse, no communication whatever with their ports, and I believe that not a Dutch vessel has even approached the coast of the territory since its occupation by the British.

The French.—Some old inhabitants remember the French. In the last war, their fleets had for a time their station in King's Island Bay, for the purpose of intercepting the Indiamen trading to China; and their rendezvous place, as well as the rivulet from whence they supplied their ships with water, were pointed out to me by the Burmese. The French however never ventured upon an inland excursion, and the inhabitants then having scarcely any notion of the existence of Englishmen, could of course have no suspicion of the relations which existed between the two nations.

Intercourse with the Chinese.—Though a number of Chinese are settled in the provinces as merchants, yet there is no intercourse directly with China either by land or water. A caravan from the Chinese province of Yunan approached last year within fifteen to twenty days' march from Maulmain, and intended to penetrate as far as that settlement, for the purpose of trading; however, jealousy, and apprehension in general, as well as the then already manifest inimical intentions of the Burmese usurper, prevented those enterprising men from accomplishing their purpose. A considerable loss to them it is said was the consequence, and probably no other attempt will be made on their part, until the relations with the petty states to the north, through whose territories the Chinese have to pass, are based upon a more secure and solid foundation.

The different nations and tribes inhabiting the Tenasserim Pro-

vinces. Constant changes in Indo-China.—The stability of China Proper and Japan for so many centuries, forms a remarkable contrast to the constant and total changes which have happened in the adjoining countries comprised under the name of Indo-China, the constituent parts of which, are Cochin-China, Tonkin, Cambogia, Anjam or Loas, Siam, and Burmah. One race of people destroyed the other, and was again expelled and supplanted like the former, by subsequent conquerors. The kingdoms just mentioned as they exist at present, are erected upon the ruin of vanquished nations, whose history even, is frequently lost.

Alompra's Empire.—The territories of the Burmese empire had the same fate; and the present dynasty of Burmah is but of recent origin. Alompra, assisted by favourable circumstances, after many struggles, bloodshed, and devastation, finally overthrew Pegu, and established a new kingdom at Amarapoora, carrying from thence his victorious arms over a wide extent of country.

History of Tenasserim.—The history of the Tenasserim provinces is involved in darkness. Who the first inhabitants were can scarcely even be guessed at, for it is not known who the inhabitants were four centuries ago. To judge from the Kareans inhabiting the interior, who seem to have outlived all revolutions of the successive conquests, and following analogy, whatever inhabitants there were they seem to have belonged to Mongolic races. Burmah as well as Siam and Cambogia, seem to have been originally peopled from the north, and it is very improbable that the inhabitants of Tenasserim were ever mixed with Malay blood. The comparatively late arrival of that race from Menamcaboo in Sumatra, in the Malay peninsula, in the districts of Jabor, Malacca, and Queda, where they formed colonies, is now almost universally adopted as a fact approaching to certainty, and if so, they had no time to disperse themselves towards the north.

Two hundred years ago the inhabitants seem to have been of Talian extraction, somewhat related to Siam; and Martaban is mentioned by the Portuguese as a place of great commercial importance; the town of Tenasserim was an important fortress. The provinces remained under Siamese dominion until the latter part of the eighteenth century, when Alompra, the conqueror, took possession of them; and notwithstanding the repeated contests and incursions of the Siamese, they remained a part of the Burman empire until they were incorporated with the British empire in the east, in the year 1826.

Change of population.—With new conquerors arrived new settlers. After Alompra's conquest the Siamese seem altogether to have with-

drawn, and to have been supplanted by the inhabitants of Burmah.

Forcible introduction of people.—In many cases the introduction of new inhabitants was forcibly effected; of this we have still a proof among the Burmese inhabitants of the village of Tenasserim. After the conquest and destruction of this once important town, the governors of the province intended to rebuild it. The Burmese however, transplanted to that place, were more than any others exposed to the continuing invasions of the Siamese, who used to carry every Burmese into slavery. The inhabitants returned therefore repeatedly to the sea-coast, and Mergui became in consequence the chief town of the province. To force however the inhabitants to remain at Tenasserim, a number of people, formerly runaways, were marked with a painted ring round their eyes, and an inscription upon their chests, and many of the older inhabitants of Mergui and Tenasserim are yet to be found with these indelible signs.

People now inhabiting Tenasserim.—The people now inhabiting the Tenasserim provinces, altogether in number not exceeding one hundred thousand, are Burmese, Talians, Siamese, Kareans, Seelongs, and foreigners.

1. *Burmese.*—The Burmese, the former conquerors and lords, are to this day the most numerous. Their chief seat was Martaban; the settlement of Mergui was the second in importance; Ye the third. Maulmain is of recent origin, sprung up since the occupation of the country by the British.

Situation of their villages.—All villages, hamlets, and even solitary plantations of the Burmese, are near the sea-coast, or on the banks of navigable rivers, or creeks. They never established themselves far inland, even since the time of their first settlement in the country.

Apprehensions of Siamese incursions, natural predilection for water, and the facilities of transporting themselves and their goods through a country where roads do not exist, and if they exist, are with great difficulty kept in order, will be found the reason.

2. *Talians—from whence.*—The Talians are the inhabitants of the kingdom of Pegu, formerly the lords of Burmah, now subdued, and the slaves of the Burmese, by whom they have been since that time always treated with severity and barbarity. The greatest part of the original country of this people consists of plains of fertile rice-ground; and from the disposition of the Talians it would seem that nature had marked them out for husbandmen, and especially rice planters.

Where settled.—From the great tracts of alluvion which the mighty Irawaddy deposited, and which its numerous branches now intersect, as well as from the banks of the Pegu and Sittary rivers, the Talians extended to the Salween, compelled as it seems to spread and to retire, on account of the oppression exercised by the little controled Burmese governors.

The province of Martaban, part of which is at present British, and comprised under the name of the Province of Amherst, was also inhabited by Talians, whence they seem to have spread from the banks of the Salween to the eastward, over the plains which are intersected by the waters of the Guin and Attaran. The mountain range to the east (now the frontier between Tenasserim and Siam) divided them from the river territories of the Menam, and appeared to form a barrier to their further extension from west to east.

Reasons of their migration towards the east.—But it seems the oppression of the Burmese in these districts, distant from the seat of government, must have been too severe to be borne; and forty thousand people expatriated themselves at once from the Province of Amherst into Siam, to exchange the yoke of Burmese rule for a milder despotism. When Amherst Province became British it was almost destitute of inhabitants.

Sensation and feelings of the Talians towards the British at the time of their first arrival.—At the commencement of the last Burmese war, the arrival of English soldiers in Pegu created an extraordinary sensation among the Peguans, the greater part of whom never before saw Europeans, who were represented to them as cannibals. When the first excitement subsided, and the people of Pegu had opportunities of perceiving that the foreign invaders were not only men like others, but much kinder enemies than they even thought compatible with the character of a soldier; they began to assist the British army, their hatred against their old oppressors broke out a fresh and they sincerely desired the total downfall of Burmese despotism.

The historian must regret to record, that conquered Pegu was again restored to the court of Ava, at the peace of Yandaboo. By this, these faithful allies were inconsiderately, and we may say mercilessly, delivered up again into the hands of their irreconcilable oppressors; an act, which they the least expected, as it was a notion incomprehensible to them, that a conqueror ever gives up voluntarily, what he once possessed indisputably. Many sought of course a refuge in the Tenasserim provinces, but many, chiefly those from distant parts, could not remove their families and goods in the first in-

stance, and were afterwards prevented from effecting their escape by the Burmese authorities. The cession of the kingdom of Pegu is the only reproach which this unfortunate race has to urge against the English.

Maulmain peopled by Talians.—The new settlement of Maulmain opposite to Martaban, now the capital of the Tenasserim provinces, was at first almost entirely peopled by Talians, and to this day it is computed that the number of Burmese to that of the Talians is in the proportion of one to twenty.

Obliteration of their distinguishing features.—The features of the Talians do not perceptibly distinguish them at present from the Burmese, the intermixture between the two races, which has taken place since many generations, has probably effaced or obliterated the distinguishing characteristics.

Existence of the Talian language.—That they are however a distinct people, is proved by their language, which they have preserved to this day, and which is said to have scarcely any resemblance to the Burmese. It is fast declining, and will probably cease to exist should the Talians continue to be subject to foreign powers, and there seems to be no probability of their again becoming an independent nation.

Burmese language generally adopted.—In British Tenasserim the Burmese language is adopted as the language of the courts, of public transactions, and of general conversation, which is but fair, as the majority of the inhabitants speak that language, and it is no grievance to the Talians, as two-thirds of them speak Burmese besides their mother tongue. The chief and almost sole occupation of the Talians is agriculture, and almost exclusively rice cultivation; they scarcely ever retire to the mountains, the amphibious life of a rice planter during six months of the year being to them the most congenial.

3. *Withdrawal of the Siamese from Tenasserim.*—Almost all the Siamese retired from these provinces after Alompra's conquest, except two villages to the south of Mergui, Boukpeen, and Lennya, where the Burmese had never resided; that part of the country, having always remained a disputed district.

From the time of the conquest, and probably before that time, Siamese and Burmese never met except as foes, and the system of alternate petty warfare, accompanied by kidnapping, plunder, and devastation, was carried on without intermission along the frontier districts, which in consequence, were soon transformed into a waste, and such they remain to this day. The Siamese seem to have been the

most dexterous in their plundering expeditions, and were, besides their greater daring, the most numerous ; for the Burmese in these provinces could only be considered as colonies, established partly by force, and kept up by dread.

Security established since the British occupation.—When security of person and property were established at the beginning of the British dominion, the Siamese government was given to understand that any such marauding excursions as were kept up under Burmese rule, would be considered as a breach of peace. The Siamese government released a number of people, about one thousand from Mergui Province, carried away during the last incursion, who were delivered up and returned to their homes.

The Siamese were of course permitted to come to the provinces on friendly terms. At first they were fearful, but when they perceived the difference between Burmese and English management, they gained confidence ; as the Burmese subjects once fled to Siam, to seek shelter under a milder yoke, so the Siamese now seek a refuge in Tenasserim.

New settlements of Siamese.—The Siamese population, consisting entirely of recent emigrants, increases, and there are settlements of these fugitives in several parts of the country ; their chief resort is the Province of Mergui, where they spread along the banks of the greater and lesser Tenasserim river.

Great difficulties it is said, are thrown in the way, on the part of the Siamese government, to prevent their migration. If caught, it is affirmed that decapitation is the inevitable consequence.

To reach the first British Tenasserim settlement, they have (besides the danger of being apprehended) great difficulties in passing through the pathless wilds ; whole families not unfrequently lose their way, erring for a month or more in the forests, reduced to the greatest extremities, living upon jungle-fruits, leaves, and barks, before they arrive near the sea-coast. It may be imagined that without these impediments, the influx of Siamese would be much greater than it is at present.

Their character.—The Siamese are an industrious, hardy race, and more enterprising than the Burmese, besides being easily manageable, quiet, obedient, and orderly. They would be, in greater numbers, a desirable accession in the wilds of Tenasserim.

They are the only people who have introduced the cultivation of the sugar-cane, for the purpose of making sugar ; of course as yet to such a limited extent, that it has not in any degree become important.

Many of them are huntsmen by profession, living for months in the wildest forests, where they shoot elephants for the ivory; they are also the trappers, tamers, and managers of elephants in general, to them in their own country the most important of domesticated animals; while in the Tenasserim provinces, under Burmese rule, elephant scarcely ever known tamed. The greatest part of the Siamese in the provinces approach more to the Malay than Chinese type in their features, which are generally very coarse, and their women very ugly, though both are generally well built, and taller than the Burmese. The huntsmen, particularly, are very nimble, sprightly, dexterous, and courageous; while the peaceful cottagers of the two settlements of Boukpeen and Lennya, which existed before the British occupation, are on the contrary dull. We cannot be allowed to judge of the Siamese as they appear in Tenasserim, for they were before they arrived the poorest class of depressed slaves, whom necessity only drove to seek a peaceable asylum. The more wealthy and favoured Siamese in the great delta or valley of Menam, and those towards the gulf of Cambogia, are said to be intellectually much advanced, and the great number of Chinese living among them, will have communicated to them more civilized manners, and improved modes of cultivation.

4. *The Kareans—their origin.*—The Kareans are the inhabitants of the longest standing in the provinces, who have survived the shocks of succeeding revolutions. Their origin cannot be traced. Some suppose them to be the aborigines of the country, some affirm they are the wreck of a great nation, fallen into dependence and slavery, expatriated and spreading afterwards over a wide extent of Indo-China, for they are found from the 11th to the 23rd degree of north latitude. The American missionaries, who are much interested about this people, are of opinion that they originally came from Thibet; the opinion seems however to rest only upon the congruity of names and some manners.

Their station.—Wherever they exist, they hold an inferior station in the country, excepting the so-called red Kareans to the north of Maulmain, who have resisted the Burmese influence,—they are mountaineers, subsisting upon prey and plunder.

The Kareans of the Tenasserim provinces, forming separate colonies, inhabit such parts as are unoccupied by any other inhabitants, which are the inland portions of the country; they there choose their abodes either on the banks of rivers or in secluded valleys. These communities do not generally consist of more than from three to twelve houses or families. As they have the custom of intermarriage, they are nearly related to each other. Soli-

tary huts of Kareans are often to be found in places where for many miles in circumference no other human being is to be found. They live exclusively upon the produce of the soil, planting mountain-rice, and some other indispensable articles, generally as much as they want for home consumption. Very rarely has a Karean a surplus, more frequently not sufficient to subsist upon.

Migration seems almost incompatible with the occupation of a husbandman, and is certainly a strange anomaly in a country highly productive; yet the Kareans subsist solely upon the produce of their plantations, and have no permanently fixed habitations.

Modes of cultivation.—When a Karean family has chosen a place for a plantation, huts of bamboo thatched with palm-leaves are constructed, and then a part of the forest is cleared, just as much as is necessary to plant the ground with rice, requisite to maintain the number of persons settled for a year. The paddy is sown upon the imperfectly burnt down forest, without any tillage or other preparation, and whatever else is wanted (cotton, indigo, sesam, vegetables, &c.) is promiscuously sown or planted on the same spot. The following year, another spot is cleared in the vicinity, and after some years, or when a death happens, the family removes to a greater distance, and begins again the highly laborious task of felling immense forest trees, visiting only from time to time the old establishment, which yet yields fruits surviving several seasons; and so the Karean wanders all his life time, without having settled permanently.

The reason for this extraordinary custom is differently accounted for. The Kareans say, that one and the same place does not produce rice for several years; an objection which is refuted by the example of other countries similarly situated, where new lands are not so abundant as here.

Others say, that there is greater trouble in keeping the ground clear from weeds, than to fell a new forest, which seems equally incredible. Probably the roaming propensity of the Kareans, and old established custom, are the chief reasons; to which must be added a great superstition and fear of *nâts* and evil spirits; such beings, having in their opinion, an allotted dominion over certain districts.

Whatever may be the origin of this extraordinary custom, certain it is, that the produce must be inferior; all perennial cultivation being in this way excluded, and gradual amelioration quite out of the question; hence it may be that the Kareans have remained always stationary, upon a low scale of civilization.

Their fate under the Burmese government.—Under the Burmese government the Kareans were depressed, and were liable to be called upon to do public works without remuneration, whenever it pleased the government.

This relation towards their masters exposing them to all kinds of vexations without hopes of redress, seems to have been the first reason of their retiring into seldom visited, or sometimes inaccessible parts of the country, where they hoped to be beyond the immediate reach of their oppressors.

Though they have been placed on the same footing with the Burmese since the conquest of the country by the British, and enjoy at present formerly unknown rights and an impartial justice, yet they are still so timid that they can scarcely be prevailed upon to visit the towns on the sea-coast.

They have a language of their own, which has lately been drawn from its obscurity by the exertions of the missionaries, though they are without any communication with their brethren in Siam and Burmah, even confined sometimes as long as they live to the narrow sphere of their self-chosen district; yet it is affirmed that the Burmese Kareans bordering upon China, at a distant of 13° of latitude, speak a dialect of the same language which is current amongst the Kareans of Mergui Province.

5. *The Seelongs—their origin.*—These are again a variety of people different from all others just enumerated. They are the last in the scale of civilization, but not the least interesting.

The Seelongs are the inhabitants of the islands constituting the archipelago of Mergui, and are a race of wandering fishermen, building temporary huts of reeds, palm-leaves, and bamboos during the inclemency of the monsoon, and passing the rest of the year either in boats, or on the sea-beach under the shade of trees; they live upon the spontaneous productions of nature, but chiefly upon the produce of the sea; turtles, fish, and shell-fish forming the principal food.

They never cultivate the ground. Their origin is unknown. Whether they are the wreck of some more numerous and independent nation, as they pretend to be, gradually vanishing from the face of the earth; or whether they are the descendants of shipwrecked people, a mixture of different races, augmenting in the course of time, will scarcely ever be determined.

Their number.—As they exist at present, they form but a petty tribe, not exceeding, it is said, one thousand souls in number, and they will probably soon be extinct, for they are diminishing annually.

They have a peculiar language, but too little is known of it to determine whether it is a mixture of the languages spoken around them, or a peculiar tongue.

Their civilization.—It may well be imagined, that they are on a very low scale of civilization, one should think far below the North American Indians; yet the term savages, so lavishly bestowed upon so many nations not meriting that epithet, is not applicable to them.

Their communities.—They form communities, divided into families, governed by strictly determined usages, which are always punctually adhered to; they accommodate themselves willingly to the laws of the government on which they are dependent; they carry on a petty trade of exchange; they have a correct notion of right and wrong; crimes are little known, and the transgressors rigidly punished; they live in peace and harmony amongst each other; their food is the spontaneous productions of nature; they are totally ignorant of what exists beyond their rocks and islands; they have no established form of religion, pretending, as they express themselves, never to have thought whether there be a future existence or not.

Their former relations with Burmah.—At the time of the Burmese rule they were the most independent and unharassed people of the provinces. The Burmese have always been very bad seamen, scarcely able to retain possession of the islands belonging to their territory, and never could cope with the skilful Malay pirates. The Seelongs however, though freed from Burmese oppression, were nevertheless not better off, for they were a prey to all the numerous buccaniers not long ago infesting these seas.

Their seclusion.—It is very difficult even to this day to meet this roaving tribe amongst the islands which they visit; they hide themselves whenever they see a strange sail approaching, and it cannot be denied, that they have reason to be apprehensive, for to this day irregularities can easily occur in the Mergui archipelago, where not a shadow of British authority is permanently established, on account of these parts having hitherto been entirely useless and unknown; and it is only to be wondered, that depredations on a larger scale have never occurred in those parts in late years.

The whole population considered.—These are the different races inhabiting the provinces. The small number of all (taking them collectively, not exceeding one hundred thousand) spread over an area of thirty thousand square miles, proves clearly that these unfortunate countries have been the constant scene of contest; that as the one or

the other nation settled, and began to thrive, it excited the envy and desire of a powerful neighbour, who in a single successful invasion devastated all, exterminated, dispersed, and carried away the population; and that the descendants of these, in their turn, were treated in the same manner by subsequent conquerors. The Talians, the Siamese, and Burmese, experienced successively these calamities, and the remaining mixed populations are the wreck and ruins of their forefathers, surviving their former sway and subsequent downfall. The Kareans and Seelongs, who as far as it is known, were always in subjection, had still less opportunity to increase and flourish.

Having no country of their own to retire to, they in the first instance under the scourging authority of the conqueror, felt all the calamities of invasion, and never enjoyed a time of undisturbed peace and prosperity, which was at least accorded to the conquered, in the intervals from one invasion to another.

6. *Foreigners—Chinese.*—The most important and most useful of all foreigners are the Chinese, whose semi-compulsory emigration disseminated them over the whole of the Indian archipelago, and other adjoining parts.

The tide of this emigration poured in, in the first instance, into Cochin-China and Cambogia, on account of their vicinity to China Proper, and half of the present inhabitants of these countries are represented to be of Chinese origin. They have acquired great importance in Siam, where 200,000 of this people are said to be alone in Bankouk and its neighbourhood. The Chinese also form a part of the population of the Philippine Islands. The Dutch though treating them from time to time very harshly, patronize them on the whole, in their possessions and dependencies, and their numbers are continually augmenting in Java, and in the Moluccas. Chinese are settled in Borneo, Celebes, Timor, and Sumatra. The British possessions in the straits of Malacca are full of Chinese; and Chinese are found to the north of Ava in Burmah.

Their settlement in Tenasserim.—The Tenasserim provinces held out but a slight prospect to the Chinese under Burmese rule, on account of the insignificance of the country. The Burmese authorities seem to have encouraged their settling, and the small number who did settle, acquired wealth and consequence, by succeeding in monopolizing the few lucrative branches of occupation in the country. They do not palpably increase, but will certainly augment rapidly when the provinces become of greater importance.

Their occupation.—The first forms in which Chinese appear in a foreign country are, either as merchants if they have any capital, or as artificers, if they have none. In Tenasserim the Chinese are merchants and ship owners, or ship-builders, spirit brewers, carpenters, blacksmiths, bakers, and gardeners. The introduction of Chinese in great numbers ought to be encouraged; they would be a great blessing in the wastes of Tenasserim if they would turn husbandmen.

To the generality of this people, Tenasserim as a promising place of resort is unknown, and it is the interest of the Chinese already settled to obstruct a more general introduction of their countrymen, in order to avoid competition. All Chinamen settled here confine themselves to the chief places on the sea-coast. All are married to Burmese women, and their children, if males, are brought up as Chinese, adopting the customs, manners, and dress of their fathers; they are however easily distinguished by their features, which are generally, in the eyes of Europeans at least, more comely than those of either of their parents.

People from India. 1. *Chinlias.*—The natives of the Coromandel coast, here generally known under the name of Chinlias, somewhat resemble the Chinese in their voluntary expatriation, which has its origin in the too great population of their own country, as they say; but probably much more from the facility of acquiring abroad in a shorter time, a sum of money with which they think to return like the Chinese into their own country again. By far the greater part of both however, have either not had time to accumulate enough, or think they have not enough, and they die before they accomplish their design. Their progeny, a mixed race by native women, is settled for ever in the country. A considerable number of these Chinlias are to be found in Penang and the other Anglo-Malayan possessions. They partly preceded, but many more followed, the extension of the British power in Tenasserim.

Their numbers.—Their number is not great, and they are confined to the places where Europeans reside, with whose customs and wants they are much more acquainted than the natives, and by administering to which they gain their livelihood.

2. *Bengalees.*—The same may be said of the Bengalees, who however are always inferior to the people of the peninsula of India in enterprise and capacity.

3. *Convicts.*—The convicted felons transported from Hindoostan, form also a part of this class of foreigners. Their number exceeds at present one thousand seven hundred.

Their fate in Tenasserim.—These unfortunate men are always treated with the utmost mildness, and the present state of many of them, who are well-behaved, is undoubtedly better than it ever could have been in their own country. The system is introduced, that after a few years' transportation, if they behave properly their irons are taken off, then they can be hired out either as workmen or private servants; as they have then opportunities of mixing with the inhabitants, they have also an opportunity of forming connexions with native women. Many of them, when the term of their banishment is expired, settle in the country, (hitherto but few of them have served out their time); they then form part of the population, as well as their progeny.

System of transportation.—This system has been much blamed, and certainly the introduction of so many felons into a country cannot contribute to improve the manners of the original inhabitants, but it does not deteriorate them in that ratio, as is imagined.

Difference between Indian and European felons.—An Indian convict is a different being from an European felon, and almost universally the former will be found superior to the latter.

Thugs.—The hideous crimes of the Thugs (the by far greater majority of convicts in Tenasserim are Thugs, or professional murderers) originate in religious motives, and when religious motives are set aside, yet the majority of the Thugs have been brought up from their infancy to murder as to a trade; after their conviction, they prove by their conduct that they are by far not so much depraved as they are supposed to be. The transportation of criminals from Hindoostan to this as well as to other territories, instead of confining them for life in loathsome prisons, is a commendable political act, and it is natural, that such parts should be chosen which are the most distant and in want of population. Though it seems never to have been the intention of Government to form in Tenasserim a penal settlement in imitation of New South Wales, yet part of the Hindoos will undoubtedly become colonists in course of time.

Armenians and Parsees.—Wherever there is a commercial place in the East, holding out a prospect of gain, there we are sure to find Armenians, Moguls, and Parsees, the chief native merchants, resembling in a great measure the Jews of Europe, chiefly such as they were in the time of the middle ages.

They are equally a dispersed people with the Jews, without a country of their own, equally industrious, persevering, and shrewd, and equally oppressed when they trust to native princes, but notwithstand-

ing wealthy. Until now Maulmain is the only place where they have settled, because it is the only place in Tenasserim carrying on trade.

The Portuguese.—The descendants of the Portuguese, so generally spread along the sea-coasts on both sides of the peninsula of Hindoostan, are also found in Tenasserim. No nation left so many survivors of its transient glories in the East as the Portuguese; but the progeny of Vasco de Gama's followers is sadly degenerated; they have retained nothing of their renowned forefathers, but the type of their religion, which is however with them only a heap of superstition and show of outward ceremonies, besides their language is barbarously corrupted by numerous Indian idioms. The European features are recognizable in many, but their condition and state of civilization are nearly the same with those of the natives amongst whom they live, and frequently much lower. They have all formed connexions with native women, and have no tie which unites them with Portugal, of which they are altogether ignorant. Their being nominally Christians, and their steadiness in adhering strictly to their faith, preserve them as a distinct class.

American missionaries.—Their are a number of American Baptist missionaries in the provinces. They have made little progress in the conversion of the natives. The Burmese do not well know how to draw a difference between Englishmen and Americans, and they consider the latter to be a peculiar variety of itinerating white people, whose real aim and purpose are to this day unknown, or indistinctly guessed at by the multitude, and to the knowing few, a puzzling enigma. They pass under the name of foreign teachers.

Englishmen almost all in official capacities.—There are besides the civil officers of government, and the body of military officers belonging to the regiments, and besides the Europeans constituting the regiments, (two at present), few English residents here, and these are almost all congregated in Maulmain, where they are chiefly engaged in ship building, or otherwise connected with the teak forests in Amherst Province. Until very lately not one English gentleman thought of settling for the purpose of calling forth into practical use the numerous resources of the country. All Englishmen have hitherto been on friendly terms with the natives, in every part of the country. The Burmese population have too much regard for their new governors, not to treat with politeness, affability, and good-will every individual with European complexion, and no European can ever have had reason to complain. The awe which European superiority, and

British political ascendancy inspires and spreads throughout the Eastern nations, influences probably as much the natives to treat an European with particular consideration, as the appreciation of security and of a mild rule conferred by the British, over such a great portion of mankind.

Character of the natives superior to the Indians.—The character of the natives in Tenasserim is, on the whole, praiseworthy. By all who have had an opportunity of drawing a parallel between them and the natives of India Proper, they are declared superior to the Indians. One of the peculiar features of Burmese character, and one which is to a superficial observer striking, is their independence and manliness, forming a striking contrast to the submissiveness, humility, and effeminacy, so universally met with in India.

Independence and manliness is an apparent anomaly, if found amongst a people, who have been swayed by one of the most despotic governments in Asia, since time immemorial; but to account satisfactorily for this apparent discrepancy, it is necessary to keep in view the nature of Indo-Chinese despotism. It is laid down in these countries, and considered by all people as an indisputable axiom, that all and every thing is the property of the king, and that the king is lord of life and land. This rule of state and nations adopted in Indo-China, operates differently for the rights of men, though they have been always under such an axiom unknown, or not understood, yet the infringement of them, could not have been every where effected equally.

I confine my observations to Tenasserim, endeavouring to shew, that independence can exist, even where a man is doomed to be the property of his sovereign from the moment of his birth.

People in Indo-Chinese governments, are theoretically slaves of the king, but not virtually. The government could not use the whole population for government purposes. If part of the population were called upon to sacrifice their personal liberty, either to carry on a war, or to accomplish some public work, it could be only a temporary measure, and after the purpose of government was effected the majority would return again to their homes, released from their temporary bondage. The infringement consists in the unjust, forcible, and arbitrary exaction of the property of the subject.

Tenasserim formed an out-station of the Burmese empire. Governors were sent to manage public affairs, who were often superseded by others, before they knew the resources of the provinces. The inhabitants therefore easily found the means to deceive their superiors about their abilities to contribute to the revenue, or refused to do so.

The village head men, or Thoogies, were generally elected out of their own tribe, and by bribing them the villagers often succeeded in deceiving their superiors.

The Tenasserim provinces were a conquered, ruined country, thinly peopled by Burmese colonists, which never yielded a considerable revenue to government. Taking the inability of the population for granted, the exactions from Ava were more moderate; and when the exaction of the governors, and the oppression of government became insupportable, part of the population found an asylum in the wilds of the country. It is said to have been a common occurrence for people to abscond with their property into the jungles, and there wait for more auspicious times. So common must have been the practice, that after a fourteen years' peace, and annually strengthening confidence in the present government, the Kareans to this day cannot be persuaded to come to town, because they have apprehensions for their personal safety.

When the rumour spread over the provinces, in 1838, that Tharawaddie's armies were approaching to reconquer the country, the people of Tairy and Ye laid up stores of rice in the jungles, ready to fly at the approach of the foe.

Their being greatly freed from the influence of priestcraft, as will be shown afterwards, and their having no castes as well, are two additional weighty reasons for speaking in favour of their independence. Their manliness is ascribable to the same source. The greater portion have often been reduced to extremities in the jungles, where skill and courage were called into play to extricate them from difficulties, and they have enough opportunities to this day to exercise this spirit of manliness, in their often protracted wanderings in the pathless wilds of their own country. Out of this state of the country, such as it was under Burmese rule, sprang another characteristic of the people, not less prominent, but not at all praiseworthy; this is cunning, shrewdness, and falsehood. Where people of every rank, from the commonest coolie to the prime minister, had to deal with despots, at whose mercy they were without appeal, and where they had to practise every kind of delusion, to evade the manifold tyrannies which threatened them, cunning and shrewdness were therefore considered virtues of the first magnitude. The common daily bazar proceedings, however, furnish a proof that they are honest enough in mercantile transactions, far more so than their Indian neighbours, and much more than the crafty, treacherous Chinese.

All engagements ought to be ratified in public courts, then they

will be observed; for the natives have such a dread of judicial proceedings, that they will scarcely ever infringe upon publicly made contracts. When after the British occupation, all was placed on a certain undeviating footing, cunning and shrewdness became to them of less avail, and are said to be daily less common. One bad quality however remains with them from the time of Burmese rule, which they cannot get rid of, this is falsehood in speech. A Burmese if asked a question, even of the most unimportant nature, scarcely ever gives a direct answer, but will ponder a long time, and then couch his words, in an ambiguous sense; and if he cannot succeed in this, he will plead his ignorance straight forward, though he may be well acquainted with the subject asked. This want of good faith is a bad quality in a subject, and it would naturally follow, that an attachment to the government cannot be relied upon, and the British government ought to be on a continual guard not to be overthrown by treachery. It can be supposed, however, that there is no fear of that; the dispositions of the Burmese on any other subject may be as doubtful as possible; but the boon which has been conferred upon them by an equitable administration is so generally appreciated, that they fear only the present state of things will not last for ever. Only few individuals, once in power, might gain by a change; but they will never find adherents amongst the mass of the population; from a rebellion therefore, the government has nothing at present to apprehend.

Religious connection of the Burmese in Tenasserim with the king of Ava.—Profound veneration and attachment to the present royal family in Ava is generally spread, and has its source in religious feelings—Gaudama the first of beings, and the royal family the next in rank in this world.

Though the Burmese in the Tenasserim provinces know that they are at present quite independent of the ruler of Ava, and are not influenced by any of his ministers or governors, yet they consider the emperor of Burmah as the head of religion, but acknowledge cordially, the worldly supremacy of the English. The more enlightened and wealthy of the inhabitants take a lively interest in the affairs of their ancestors' country; the overthrow of the king and his ministers, the usurpation of Tharawaddie, the subsequent expulsion of the crown prince, were watched with anxiety, and the present cruel proceedings keep them in awe and suspense.

The Burmese hold the customs of their forefathers in high veneration, but not so the laws imposed upon them by their superiors. The reason is, that the laws until lately have always been

arbitrary, too often not conducing to their happiness, and frequently contrary to their interest. The Burmese accustomed to tyranny, never questioned the right of imposing whatever laws their superiors thought proper, but they opposed them when they had the power, and evaded them when they had the opportunity. * * *

The love of country in the Burmese, is based much more upon natural, than moral ties. It is the face of the country, the manner of living, the similarity of occupations which ties the Burmese. As far as his language is spoken, and the face of the country is the same or similar, this is his country. From the banks of the Tenasserim to the mountains above Ava, forming the Chinese frontier, a Burmese is at home, and would be so in Cochin China could he make himself understood. The moral ties, the recollections of his youth, his parents, his wife, his children, do not so much rivet him to the spot, as the ties above mentioned. Hence a Burmese is easily induced to exchange his sojourn in Mergui for a better livelihood in Maulmaim or Rangoon, but a Burmese will never be found to expatriate into Hindoostan Proper, and very few are to be met with in Penang.

Common Interest.—The common interest which an assemblage of communities exercises, has little weight in the eyes of a Burmese. He prefers the British countries, because they are safer; but supposing an equal guarantee were held out to him in Pegu or Ava, he would scarcely settle there as in the Tenasserim provinces.

Fame, fortune, and power, cannot be appreciated by the natives of these countries otherwise than as they contribute to their bodily welfare. To consider them as the means of accession to moral ends, would appear ridiculous to the Burmese. The above passions had amongst the Burmese, a much wider field for development under their own government, than under the British. The wish to become illustrious seems at present to be nearly stagnant, they perceive that the Europeans are mentally their superiors; that the power wrested from them, is entrusted entirely to the former; and they know that they have to develop their talents only in the functions of native magistrates.

Desire after fortune is innate in every human breast, but it is less inordinate in the Burmese, simply on account of not knowing how to employ it; for fame and power, cannot be longer bought with fortune. It formerly rendered a Burmese famous, to employ his fortune in building pagodas and endowing khiaungo, or monasteries. The people emulated the prince and the ministers, who expended immense sums in this way. The British government has nothing to do with the

embellishment of Buddhistic symbols, or with the support of the numerous Buddhistic monks, and the people begin to be tired with the exertion of a sort of fame, which is not appreciated by their superiors.

Avarice.—Avarice, or an inordinate desire after fortune, without considering it as the means of gaining any thing else, seems as far as I have observed, no native vice. The Burmese hoard up money frequently in secret places under pagodas; not unfrequently in the bamboo rafts of their houses; but this does not originate in avarice, but in the apprehension of insecurity, and ignorance how to employ the capital advantageously. All Asiatic nations, living under despotic governments, who have constantly the violation of property to fear, act in like manner, and bury their valuables. British stability is not yet understood, and the certainty, that the British will maintain the country against expected attacks from Burmah and Siam, not yet believed in; so that the natives cannot be blamed for following the impulse of their distrust.

Rights of property.—The rights of another's property, are well understood and generally held sacred; except in the larger places on the sea-coast, where, like in all larger congregations, irregularities are much more common; however very few thefts happen in the country; property entrusted to natives by Europeans is very rarely embezzled; and with money they are considered more trusty and honest, than the same classes in Europe.

Robberies.—Robberies committed on the highway, or on the water, are unknown as far as I am aware, since the British occupation. Those committed on the Salween last year cannot be imputed to the Tenasserim people; they were perpetrated at the instigation of the hostile neighbours on the Burmese side.

Murder.—The same may be said of murder. To commit deliberate murder is not within the sphere of Burmese character, and murder committed in passion is equally rare, for the Burmese are much more calm than excitable, and form in this respect a great contrast to the Malays, their neighbours.

Passions—revenge.—That the Burmese are not passionate, is obvious even to a superficial observer; how far they are revengeful I do not know; however, I never had an opportunity of witnessing inveterate rancour, or hatred. There are no hereditary quarrels; in which respect the Buddists, amongst other good qualities, have again the preference over the Mussulmen; the neighbouring Malays being

equally famous for implacability, with their religious brethren in Arabia.

Politeness.—The opinions which have been disseminated in Europe about Burmese in general, where they were represented as blood-thirsty barbarians, are wrong. On a mere superficial acquaintance, their mildness and placidity are apparent. Their behaviour is conformable to strict rules of decency. Politeness is the characteristic of all the natives of Indo-China, which amongst the lower classes in Europe is too little exercised, and which is again exaggerated when speaking of the Chinese. The Chinese are more formal than polite, on the contrary, they are sometimes rude. The Burmese are naturally polite, not only to strangers, but amongst themselves. Boat people gathered together by order of government, and strangers to each other, live crowded in a small place for months in an uninterrupted state of harmony. Common coolies address each other as Sir, and the rare occurrence of fights and quarrels amongst the lowest classes, shows, that they know how to pay each other, on all occasions, that deference which is due to a fellow creature.

Courtesy and good fellowship.—Courtesy and good fellowship are strictly adhered to; the people of one village form a community, bound together by friendship and mutual wants; and a stranger not entering into their adopted mode of life is not tolerated.

Exercise of charity.—Charity is little exercised in a country where real wants do not exist. The disabled and decrepid are maintained by their families, relations, or even by strangers. The exercise of charity amongst the Burmese cannot be considered a virtue, as its practice does not call for a sacrifice, the alimentary subsistence of a person amounting monthly to a mere trifle.

Hospitality.—Hospitality is considered in all (not European) countries, not a virtue, but a duty, for in a country where the comforts of life are not so far advanced, as to lead to the establishment of inns, all intercourse with people in distant districts would be interrupted without hospitality. Hospitality in general, is dictated either by philanthrophy or by religion. In the latter case, it embraces men of a particular sect, party, or nation, and such hospitality is chiefly exercised in Mussulman countries; philanthropic hospitality has its origin in the common rights of society,—such is exercised by the Buddhistic nations. In all parts are zayats, or resting places, built expressly for travellers, who take possession of the building by right, and if the travellers be poor, they are provided by the inhabitants with food, sometimes on application, and sometimes without.

It is a peculiar institution in Buddhistic countries, to erect sheds at short distances in which are placed chatties (earthen vessels) filled with water to afford drink to the wearied traveller.

Temperance.—Temperance is one of the shining qualities of the Burmese; their fare is simple, moderate, and wholesome. They subsist chiefly upon vegetable substances,—rice is their chief food, all other ingredients secondary.

Like all natives of the tropics, the Burmese are fond of spices; these condiments seem necessary to digestion in equatorial climates. The majority of the people, who are Buddhists, do not drink spirits, a drunken man being considered a degraded being. The Kareans make an exception, they indulge in temporary intemperance on solemn occasions. Opium smoking exercises its baneful influence wherever the drug is introduced; it is fortunately however too expensive a vice, to which rich people only can be addicted. In the public opinion, it is held degrading, and the epithet of "Opium smoker," denotes a bad character, capable of performing the worst acts.

All nations whose climate permits them to remain unencumbered with clothes, whose abodes permit the free circulation of air, whose occupations are mostly in the fields and woods, and require a free exercise of the limbs of the body, will be found possessed of agility, dexterity, and hardiness, which are the concomitants of good health, if no local causes operate inimically. The Burmese in Tenasserim are remarkably healthy, strong, and muscular, without being powerful.

Perseverance.—The Burmese are capable in moments of excitement of great exertion, but their energy is of short duration. Want of perseverance is a characteristic of them; the reason of which may be, that few of them are engaged in regular, never ceasing, monotonous labours. The Burmese mode of life does not force them to toilsome, long continued exertions. In a highly cultivated country they gain their subsistence with little trouble, and because they scarcely ever know absolute want, or even poverty, they are more indifferent to affluence.

Patience.—Patience is the result of that mode of life which people are generally obliged to lead, who occupy countries where nature has scattered her bounties with parsimony. Though few of the Burmese are exempted from the cares of life, and the vicissitudes which attend a regular occupation, yet disappointments are not often experienced; and as only the repeated experience of disappointments creates patience and endurance, the Burmese cannot possess that virtue.

Love of children.—One of the chief virtues of the Burmese is the love of their children, so long as they are young and helpless. This characteristic they have in common with all nations who live in a state of nature, the social connection between child and parent being the first and strongest. Burmese parents are in a state of distraction when any accident happens to their progeny; and the death of the child is often considered an irreparable calamity. Great numbers of children cannot be a burden in a country which is highly productive, thinly peopled, and enjoying security of life and property. A childless age is considered one of the greatest punishments imaginable. It will easily be perceived, that under such circumstances infanticides are entirely unknown. It does not seem here to be the case, that the love of the child holds equal pace with that of the parents.

Love of parents.—The facility of gaining independence, and the state of almost unbounded liberty in which the children roam about from their first infancy, loosen very much the ties of filial duty; there are however, but few instances of direct ingratitude on record; numerous cases however are known, where a son has taken voluntarily a debt of his father upon himself, and become a debtor servant for 7 to 10 years, to deliver his father from ignominy and prison.

Marriage.—Marriage is entirely a civil act amongst the Burmese, and considered as binding only so long as both parties find it convenient. Separation is of daily occurrence, and no public blame is attached to it. Such union cannot be supposed to possess moralities. Natural fidelity is therefore not absolutely required, and adultery is the more frequent, as there is no public ignominy attached. So an adultress; a women lives in illicit intercourse with the consent of her husband, and when separated can form again a new union without prejudice to her, and without her new husband troubling himself about her past conduct. The seduction of unmarried girls is rather a rare case, almost impossible; because a girl attaining the age of puberty is as soon as possible disposed of by her parents. The infidelity of the wife here forms a striking contrast to the rigorous jealousy with which females are guarded in all Mussulman and Hindoo countries; it is not only met with in Burmah, but equally in Siam, Cambogia, and Cochin-China. The natives of these countries all professing Buddhism, it seems to have its source in religion, much more as the Kareans, who have no positive mode of worship, are in this respect much more strict than their Buddhist brethren.

Polygamy.—Polygamy is allowed in Buddhistic countries, and the number of wives is (as wherever polygamy is introduced) in propor-

tion to the means of maintaining them. The generality however are content with one wife at a time, and the bad effects of polygamy are confined to the comparatively small number of the wealthy. Marriage is contracted easily. The difficulties in over peopled countries, where a certain settlement or occupation in life, or a certainty of income is necessary, before people marry, are not experienced, here where every body if he like, can maintain a wife and family with ease. Polygamy and faithlessness, divide and loosen the affections of parents toward their children, yet it has been stated that the Burmese doat on their children; and it is a strange anomoly, which is however daily seen at Maulmain, that a Burmese has a particular predilection for a fair child by his wife, even when he is well aware that it is a spurious offspring. This is, however, only the case amongst the lower classes. We have not yet any proof, how children by English fathers and Burmese mothers will turn out when grown up, the intercourse between the two nations having subsisted but fourteen years; if we however may judge from what the children promise at present, we should be inclined to anticipate that they will be superior to the progeny of Europeans by Indian women.

Religious establishment for the education of the children.—Polygamy and connubial faithlessness have also in general bad effects upon the education of children, diminishing the care and attachment which ought to be felt. The religious institutions of the country have provided for this case. The children are at an early age placed in monasteries, established at almost every village, and endowed by the voluntary contributions of the inhabitants. There the children remain for a certain period of their boyhood, where they are fed by the monks, and instructed in reading, writing, and religious rites.

This is the education which almost all Burmese attain, but they seldom know more; hence the general diffusion of elementary knowledge, and general ignorance in the higher attainments of science, and the great uniformity of knowledge throughout Burmah.

Knowledge of the priests.—The Pomgys, or priests, are considered the learned men of the nation; but their knowledge consisting in the explanation of theological and metaphysical doctrines, is therefore mystical, but the more appreciated by the vulgar majority, because incomprehensible.

Religion.—The peculiarities and characteristics of a nation are mostly intimately connected with their religion. Religion either dignifies or degrades the human character. In considering the religion of the inhabitants of these countries, we must form a distinction between

the Seelongs, Kareans, and Burmese, for all three have different creeds, and therefore different ideas of the Deity.

Religious belief of the Seelongs.—The Seelongs must be considered in this respect, as a people in the lowest scale. Yet the idea of the Deity forces itself upon the most savage mind.

These people have no religious creed, they have no established mode of worship, i. e. no outward manifestations of their acknowledgment of a superior being; yet they have a vague idea or impression, that there exists besides mankind, some other not visible beings, exercising an influence over the destinies of mankind, &c.

To them even the notion of polytheism and idolatry is too vague, and as far as I could, after a prolonged inquiry, understand, they believe that the sea, the land, the air, the trees, and the stones are all inhabited by nâts or spirits, either good or evil; who direct the motions of these bodies; who produce the growth of plants, &c., &c. How far these spirits influence men, they do not pretend to know. Of a future state they are entirely ignorant upon for in touching, this question, they invariably answered, "We do not think about that." The observation of things around them, seems therefore to strike their poor minds; and their small share of reflective power, leads them instantly to the acknowledgment of an invisible superior being.

The dawn of reasoning and the idea of a Deity, however imperfect, seem therefore identical; and the belief in nâts or spirits, seems to be the first and lowest of all religious creeds. The opinion that the lowest religion begins with idolatry, is not corroborated by what we find amongst these people; the Seelong's idea of a Deity is so imperfect, that he does not even represent it by a figure. The idea of the Deity being in its infancy indefinite and vague, idolatry itself is an advance to positive religion.

Religious belief of the Kareans.—The Kareans, who are already more advanced than the Seelongs, have also the idea, that certain trees, or caverns, or animals, are the abodes of mighty spirits, to whom they however do not as yet assign a form. The Burmese on the contrary, who have already their system of the Deity, embody these notions, form images, and pay them superhuman devotion, as the representations of these conceived and systemized ideas. The Seelongs apparently not believing distinctly that superior and invisible powers directly influence mankind, propitiary sacrifices, and an external mode of worship are not introduced. The Kareans having an idea of the direct influence of nâts upon the destinies of mankind, offer sacrifices to them, consisting of fowls, tobacco, rice, and pieces of mo-

ney, depositing them in certain reputed places in the jungles, and sometimes under small sheds, near their houses. The Burmese have a strictly observed ceremonial, external worship, celebrated in temples, pagodas, &c., &c.

If it is true that morals cannot exist without a positive religion, and that morals cannot be maintained without the notion of a future state of rewards and punishments, the people of this portion of the world cannot be in our sense moral, for the Seelongs and Kareans have no established religion, and the religious creed of the Burmese even excludes a continued active state after death.

Buddhism.—The leading features of Buddhism are predestination, metempsychosis, and final annihilation or absorption.

The principal moral precepts of Buddhism are the following,—

1. Eschewing every kind of evil.
2. Fulfilling of good.
3. Purifying or cleansing of the heart; which latter again is obtained by *Neggen sheet ba*, or the eight good ways, which are, i. Caution. ii. Security. iii. Rightly directed intelligence. iv. Right actions. v. Right words. vi. Right opinions. vii. Right intentions. viii. Right way of supporting life. According with the destiny of their good or evil actions all men pass after death into certain forms, become nâts, or a lower degree of spiritual beings, or they continue to be men, or they turn into brutes. The highest degree of perfection to which any being can or will come, after passing through numerous grades of nât existence, is *Neibban*, or annihilation, or following the translation of others, an existence in a perfect state of quiescence. This is the essence of Buddhism, a religion generally diffused over a great portion of Asia; probably, counting no less disciples than Mahometanism or Christianity. Most of the people are satisfied with performing the rites of their religion, without attempting to understand its theology, and even among the priests few are able to expound their religious tenets, because there are few who can read and write Palí, in which language their religious system is written.

They content themselves with the recitation of certain prayers, invocations, &c. and, the priests as well as the mass of the people, find it much easier to perform external ceremonies. The Buddhist adherents do not try to make converts, at least not in this country, and they are equally tolerant to all sects; they do not affirm that their creed is the best or alone true, but say it is that religion fitted best to their country, state, and individuality, and they adhere strictly to this faith.

Conversions to Christianity in Tenasserim.—Few Burmese turn

Christians from the conviction of the superiority and blessings of our religion; and isolated are the cases of those, who for the sake of worldly gain became nominally Christians. The missionaries have hitherto signally failed in their endeavours, and the reason of the want of success with the Burmese is not fanaticism or obstinacy, but religious dogmatical indifference. They admit the beauty of Christian morals, but contend that theirs is equally good; and with reference to the dogma they say, that the Christian is equally unintelligible with the Buddhistic, and that in comparing both, they do not see any great difference; it would be bad to abandon their notions and customs, their families, and all that is holy and dear to them, to follow the advice of strangers. Kareans, on the contrary, who have positively no established mode of worship, embrace Christianity; and some of the American Baptist Missionaries, who settled amongst them, did much good. Infinitely more could be done, if all the Missionaries were equally well fitted to open the hearts of these simple children of nature by mild persuasions, instead of filling their minds with distrust by holding up the terrors of damnation.

Recapitulation of the aforesaid.—After having touched upon the essence of religion, the state of morals, the characteristics and peculiarities of the people, we are led to the following conclusions—

1. That the inhabitants of the Tenasserim Provinces possess the virtues of uncultivated nations.

2. That they cannot be expected to possess the higher morals and virtues of nations advanced in civilization; that fortunately the vices of polished nations, are, if not unknown, yet rather rare amongst them.

3. That their vices are in a great measure the consequence of the long misrule of highly oppressive and arbitrary governments.

4. That they possess original views of morality, different from those of Europeans on certain subjects, which are chiefly applicable to the comparatively low estimation of chastity among their women.

5. That the whole nation is educated to a certain degree, but that education stops short at that point, and that no higher cultivation can be expected from the present state of things.

6. That religion is no impediment to their advancement, as it does not imbue them with prejudices against other creeds, and that the absence of the caste system, so obnoxious in India, is a great advantage if their improvement be contemplated.

7. That the Burmese are therefore capable of great improvement.

Diffusion of European knowledge.—Very little, or nothing has hitherto been done by the British government, to educate the people.

There are three schools established; however, they are more for the benefit of country-born and Portuguese than for Burmese. The Burmese are not averse to learning European arts and sciences, on the contrary they have a predilection for every thing European, the whole nation being convinced, that Europeans are superior to them in every respect.

If means and inducements were diffused to learn the English language, it would form the first important step to the mental improvement of the Burmese; for with the introduction of this language, English sentiments are easily instilled. The establishment of well regulated schools upon these principles would be a great boon, especially if the distinguished pupils, were rewarded with minor places under government.

It would have, besides, the great advantage of rendering the people more attached to their foreign rulers, and acquainted with English ways and customs, of which they are at present entirely ignorant.

The present form of government is too new, too strange to them; the relations between the British and the natives, too few, and too distant to expect, that sympathies should at present exist, or attachments be formed.

Though the British government all over India is well established, and is preferred, because decidedly better than any other formerly existing, yet the governing and managing Englishmen, personally, though in many instances highly esteemed, are not always liked, and very rarely beloved, because they are in most cases to the natives a strange enigma.

Value of the Tenasserim provinces as a part of India.—In the first years of their occupation, the question was raised, whether it would not be more advantageous to restore them to Burmah; and when this was abandoned, because deemed impolitic, they were kept as a necessary burden, the expense annually exceeding the revenue derived from them.

Their possession, however, is valuable in a political point of view, besides, containing the elements of great wealth and riches, which want only development, to become pre-eminently conspicuous.

1. They command a great part of the eastern side of the bay of Bengal, which bay became, since the occupation of Tenasserim, a British sea, excluding any other power, and affording additional security to the rest of the Indian possessions.

2. They prove an advantageous position towards Burmah itself,

which is peculiarly visible at the present juncture of affairs with that power. Maulmain being the main point from which an invasion and conquest can easily be accomplished, without being obliged to plunge at once, as in the last war, into the hostile territory.

3. Their natural wealth consists, in a number of valuable productions, unknown at the first time of their occupation, and which are more or less wanted in India, such as tin, iron, coal, teak, and other valuable timber, and a host of other minor productions.

4. They afford the best possible field for European enterprize, being adapted for every kind of tropical cultivation, affording therefore the greatest inducement to make them the resort of Europeans.

ART. II.—*Memoir on the Climate, Soil, Produce, and Husbandry of Afghanistan and the neighbouring Countries.—By Lieut* IRWIN.[1]

PART III.

SECTION, III.—*Of Animals.*

143. These countries have for the most part the insects and reptiles, noxious or otherwise, of the neighbouring ones, and present in this department little subject for remark. The warm and moist, abound the most in flies, musquetoes, and scorpions. Peshawur is famous for the last, but their bite is not mortal. During the spring months flies are very numerous, but before midsummer they are greatly diminished. White ants are but few, and in Cabul and the west, there are none. The musqueto is only troublesome in Cabul for about forty days of midsummer. Khoorasan in general is a dry and temperate country, and has few musquetoes; but there are exceptions to the rule, and particularly Hirat and Seestan. The musqueto of Seestan is remarkably large and troublesome. It is pretended they are produced in the fruit of a certain tree, which is, however, not peculiar to that country. To escape their attacks, the natives sleep in what they call pusheekhanas, which are made of the cotton stuff, in Hindoostan called guzee, and which is either made in the country or imported from that to the west. The horses which have not this defence, are so severely bitten as to bleed from the effects, and roll themselves with the pain. The end of summer and the autumn is the season of the musqueto there, as in most other places. Wasps are most numerous in the cold countries. Snakes are found in all except the very coldest, but most of them are innoxious Futihabad, between Jellalabad and Cabul, abounds in

[1] Continued from p. 900.

venomous snakes. The locust is found in these countries, but commits the greatest ravages in the warm ones and the open plains; it is commonly observed that they are brought by an easterly wind. Two seasons are yet well remembered in which these insects ravaged a part of Khoorasan. They have visited Cabul in this manner but once in the present generation.

144. The wild bee, of the kind which we have domesticated, is a stranger to Cabul, Khoorasan, and Toorkistan. Its nests are very common in the woods of Kushmeer, and beyond the Indus we find them as far as some parts of the Kafeir's country; in the south they are plentiful; at Bels, on the borders of Bulochistan, they are made on the branches of trees or shrubs, in the clefts of trees, or even on the ground, and contain as far as 30lbs. of honey and wax, but the average is only one-third of this amount. In the warm climates are two seasons of honey, one in May another in October, but the latter only is known in the cold. Two kinds of bees are distinguished, a smaller and larger. The larger has been chiefly domesticated in Kushmeer. A large earthen vessel is built into the wall of a dwelling house, care being taken to turn the mouth inwards, and to perforate the bottom of the vessel, by which means the bee shall have access to it from without. The mouth of the vessel is shut up, but so, that the owner may open it when he intends taking his share of the honey. Things being thus prepared, a colony of bees are introduced, and being fed on sugar, soon become reconciled to their dwelling. At the proper season the owner takes his share of the honey, and leaves a portion for the sustenance of the bees. The Kushmeerees leave them very little, but make some amends by introducing from time to time boiled pitha as their food.

145. Fish are an important article of diet only in Kushmeer, Sindh, and the neighbouring coast. The species known in our upper provinces, for the most part are found in the rivers of the Punjab and at Peshawur; in Kushmeer, however, the alligator and that other more dangerous animal which the Hindoostanees call *mugur*, never appear to enter the river, nor are they known in Khoorasan or Toorkistan. Khoorasan has few fish, even if we comprehend Seestan and its lake.

146. This lake is more noted for fowling than fishing. Among its reeds are great numbers of a web-footed bird, which the natives call ghoo, and catch in nets solely with a view to its feathers, which are used in stuffing pillows, and for other purposes. In all these countries ducks are found in a domestic state, but never in great numbers. At Tashkund geese are kept. The common fowl is much kept by the

pasturing tribes. In Bajour, the whole of Toorkistan, especially Bulkh, and some other quarters, this bird is found in a wild state. The chief prey of fowlers is the bird in India called chikor. Some Indian birds are not to be found wild in Peshawur, far less beyond it, for instance the peacock, and that which the English call the adjutant. The parrot and myna are scarcely natives of Toorkistan, or at least of the country beyond the Oxus.

Quadrupeds.

147. The brown ground rat of India is well known in many quarters of Khoorasan and Toorkistan. It prefers a sandy soil, and is a formidable enemy to growing or ripe crops. The musk rat perhaps does not extend to Cabul. The cold countries of Toorkistan and Khoorasan, excepting Hirat, have not the squirrel. The monkey and mungoose are also not found in the same countries, except in Kushmeer, to which the mole seems confined. Hedgehogs, porcupines, turtles, and tortoises are generally diffused, as is the hare. White hares are chiefly found beyond the Jaxartes. In Cabul only is the hare kept in a domesticated state, and they may be purchased in the market for eight annas. The rabbit is not found in these countries, India, or Persia.

148. A variety of the cat is bred in Cabul, and some parts of Toorkistan. By us it is very improperly called 'Persian,' for very few are found in Persia, and none exported. The Cabulees call this cat bubuk or boorrak, and they encourage the growth of its long hair by washing it with soap and combing it. With respect to the other species of the cat genus, the tiger is found as far as Tashkund, but in that temperate climate he falls much short of the Bengal tiger in strength and ferocity. The lion is a native of Persia, and some are found as far as Tashkund, in a northerly direction and in an easterly. There remains no doubt of lions being found in Hurriana; but in many of the intermediate countries this animal is very rare. Neither the lion nor tiger is found in the cold climates, such as Kashkar and the Pamer. Leopards seem to prefer cool hills. They are very common in the Kohistan of Cabul, but they do not attack men.

149. The wolf attacks man only when urged by excessive hunger, and hence is the most formidable in cold countries and severe winters. The jackal is known every where, except in the coldest and driest districts. The fox of Toorkistan, and generally of the cold and temperate countries, has all the cunning of the English, unlike the puny fox of India. Chinese Toorkistan is the only market worth

mentioning for peltry, and thither are carried from independent Toorkistan, skins of the common brown fox, the black fox, the sable, the ermine, the beaver, and some other fur bearing animals. These are partly known in Khoorasan and Persia, but (except the brown fox) are not found in Cabul or Afghanistan in general. From Toorkistan are also carried the furs of young lambs, the best of which reach the court of Pekin. The lamb must be killed when a few days old.

150. The Mahomedans reckon the bear impure and forbidden, but find several uses for his skin. He frequents the vallies of cold hills, and especially if they possess a stream. In Kushmeer there seems to be two species, the yellow and black. He is scarcely found among the detached hills of Khoorasan. The hog prefers the plains, especially if shrubby. The Hindoos sometimes eat his flesh in secret. The Kafeir's alone eat bears. In Toorkistan young horses are fed up to be slaughtered, and the onager, where found, is eaten. The rude tribes eat flesh in general in a half boiled state, and sometimes raw. The ass and mule are no where eaten.

151. Among quadrupeds, the chief game are the various species of wild goat, antelope, and deer genuses, which pass into one another in such a manner that there is great difficulty in identifying the species from description. The goats inhabit the mountains, the antelopes and deer prefer the plains. Khootun is famous for its musk deer, which are known to be found in some parts of Tibet and on the Pamer. An inferior kind of musk is brought from upper Swad, or perhaps the country beyond it to the north. With respect to what the natives call wild sheep, they cannot be of the same species as any of the domesticated kinds, but are probably what zoologists call *ovis ammon*.

152. There is no reason to believe the existence of wild horses in any of these countries. The animal which the Persians call *goorkhur* is, I presume, the onager, or wild ass of naturalists. This animal is of incomparable swiftness but may be killed by art. He is common in Persia, the western part of Khoorasan, and the plains of Toorkistan, from which he extends north into the Russian dominions and the centre of Asia. A few are kept by the Ymaks more for curiosity than use. Before proceeding to quadrupeds strictly domestic, we may mention the *bos grunniens*, or ox of Tibet, which is found in a wild state on the Pamer and the upper parts of Budukhshan, and has also been domesticated by the Kirghizes, who frequent the Pamer. They keep a few of the common kind, but many more of this species.

Domestic Quadrupeds.

153. The horse of Toorkistan has long been famous, and forms the chief article of export from that country to Afghanistan, India, and Persia. From certain quarters in Khoorasan (chiefly the north-west) horses are exported to the same countries, but in less numbers. In both cases it is chiefly the pasturing tribes who rear this animal, which is but rarely housed even in winter, or in the cold country of the Ymaks; they are not very numerous in Bulochistan, neither are they found of remarkable goodness either in that country or in Afghanistan. In the neighbourhood of Bameean however, and some other parts of the north, is a breed of very strong and serviceable ponies. Those of Tibet are broader, smaller, and stronger. In the country of the Yoosufzyes, and some parts of the country between the Indus and Hydaspes, in Bunnoo and Daman, we find a breed of Tazee horses, which are much esteemed. Horses in Kushmeer are neither numerous nor good, but there are considerable numbers of ponies.

154. The ass gradually improves as we proceed westward from the Company's provinces. Perhaps the best are those in the west of Khoorasan, but even these are much inferior to the Arabian or the Spanish. Asses are imported into Cabul from Bokhara and the north-west of Toorkistan. Mules are scarcely raised in Toorkistan, the best are bred in Khoorasan; a slender species, but yet hardy, is bred in Pothwar and the neighbouring districts. They are raised in the vallies of Jajee and Foree, in Teera, and some other places.

155. Tibet, Kushmeer, Kashkur, Keerategin, Durwaz, the upper parts of Budukhshan and the Huzara country breed no camels, being too cold, moist, or rugged, for that animal. Beyond the Jaxartes is the two humped species, in the Toorkee language called *uzhree*, and by our writers, (I believe) Bactrian; his height is far less than that of the Indian camel, his hair longer, he is not capable of bearing severe heat, and is not easily naturalized even in Bokhara. In the kingdom of Kokun he is the prevalent species, but in some places neither is known. The camel called *bughdadee*, has also two humps, but his height is equal to that of the Indian. He is found chiefly in the south-west of Khoorasan, yet even there is much out numbered by the Indian species. This species is very abundant in the whole of Bulochistan, in Sindh, and the borders of the Indian desert. In those countries soldiers are often mounted on camels, and some breeds are remarkable for their swiftness. The camel of Ghuznee and Cabul, originally of the same species, is now somewhat changed in his properties by the climate; he cannot bear the winter cold of these

countries, and probably exceeds the Indian camel in strength, but yields to him in patience of thirst and hunger. With respect to appearance, he is not so tall and slender in his limbs.

156. The Punjab, Sindh, and the Indian provinces of the Afghan monarchy considered as a whole, have cattle nearly in the same proportions as in our upper provinces, and the quality is not very different. In the detail we find great differences, the cattle on the west side of the Jumna are superior to those on the east, the oxen of Nagour and cows of Hurriana are much celebrated, even the cattle of the Punjab are probably superior to those of our provinces east of the Jumna; those of Peshawur are certainly inferior, and the cattle of Sindh are not remarkably good; yet great numbers of them were carried from Buhawulpoor by Tymoor Shah's army to Cabul, where the breed is still perceptible. The native breed of Cabul yields the most wretched bullocks, but considerable numbers are every year brought from Nasour by the Lohanees, and others who travel on the southern road to India. Cattle are brought to Peshawur from the Doval of the Hydaspes and Indus. In Seeweestan cattle are not numerous or good. In the middle and west of Afghanistan and in Khoorasan, they constitute no very considerable part of the national wealth. Being kept by farmers, their numbers are in proportion to the village, and hence they are more frequently found among the hills. The pastoral tribes of the open country keep but a few bullocks to carry their tents, the cow is therefore usually house fed, or fed on meadows and gardens near the village. Round the lake of Seestan, however, are seen great herds of cattle, which pasture on the marshy grounds. The cows of the west in general give more milk than those of our provinces, and in the Ymak country some give as far as fifteen seers; a very small breed kept by some tribes of the Kafeir's gives as far as twenty seers; the cows of Kushmeer give a great deal of milk of a poor quality.

157. The buffalo is not fitted for cold countries, hence he is scarcely to be seen in Kushmeer, notwithstanding its moistness; and by far the greatest stock is in Poonuch and Rajur and its other dependencies to the south, which have a much warmer climate. Far less is the buffalo suited to the climate of Cabul, which is both colder and drier, yet in both countries diligent search would probably discover a few. Buffaloes are numerous in some parts of the Punjab, and they give more milk than in the Company's upper provinces; as far thence to the north and west as the warmer plains and vallies extend, this animal is bred, but according to circumstances in greater or lesser

numbers. In Seeweestan sheep are the favourite stock, and in the Daman, cows. In the warm parts of Pukhlee buffaloes are very numerous, and in Swad and Bhooner they constitute the chief stock, yet are buffaloes not used for carriage in those countries. Beyond Jellalabad and Lughman, buffaloes are scarcely seen. The climate of the warm parts of Toorkistan and Khoorasan is certainly favourable enough to this animal, which is yet in a manner unknown; some are indeed seen near Candahar, and a few years ago several were kept in the neighbourhood of Milkh. The buffalo probably extends from the delta of Sindh, west, along the coast of Bulochistan; but the whole of the inland parts of the west, and the whole of the hilly tracts of Bulochistan are destitute of this animal.

158. Sheep are kept in all these countries, nor does there appear to be in Bulochistan any tribe which depends on camels alone, like the Arabs of the desert. The sheep are of two breeds, easily distinguished; the heavy tailed (called doomba), and the light tailed. The latter species is that found in India, and thence extend west into Sindh, and part of Seeweestan. The sheep of the Daman are generally of this kind, which also prevails nearly to the utmost limits of Pothwar. In Kushmeer, Tibet, Kashhur, most parts of upper Budukhshan, and among the Kafeir's, no other is known. In such a tract of country many varieties must occur in appearance and value; the finest wool seems to be that of the Indian desert, and the Rajpoot country. The doomba is found in all the other countries; and is the prevailing species in Persia, with the exception of Geelar and Mazundarum. The doombas of Toorkistan, and particularly that bred by the Kuzzahs is very large. The doomba seems a superior species to the Indian sheep; the wool on an average is equal, the carcase larger, and the flesh richer flavoured. The lamb is reckoned one of the delicacies of the spring season. The pasturing tribes of the west do not in general suffer the ewes to lamb twice, but where sheep are kept by farmers in small numbers an autumn lamb is dropped, which however does not thrive so well as the spring one. In Kushmeer, the environs of Cabul, and most other places where the sheep are housed in the winter, only one lamb is had from the ewe, but in the upper parts of Budukhshan a contrary practice prevails.

159. Every flock of sheep ought to contain a few goats, which lead the way in pasturing. In some countries goats and sheep are nearly equally mixed, but some situations are so steep and rugged, that sheep cannot accompany the goats. Where it is practicable to keep them, sheep are a more profitable stock. The goats of these countries present

some striking varieties; black is the most common colour, but those of the mountains from which issue the Beah and Sutluj are generally white. The goats of the Kafeir's have sometimes very long horns, curiously twisted; those of the Wuzurous have sometimes long horns, and each horn twisted as it were round itself, like the pillars of Jewish architecture. In that great range of mountains from which the Ganges and Jumna flow, we find even as far as the left of the Indus a breed of goats of great size and strength, and the natives employ them to carry commodities on roads not practicable to any other beast of burden.

160. In the Punjub the same animals are employed for carriage and burden as in our provinces, and the properties are nearly the same. Elephants, become rarer and rarer as you proceed westward. Beyond the Indus an elephant draws as many spectators as an European. In the Doab of the Hydaspes and Indus, mules are a good deal used for carriage. In Sindh, the countries bordering to the east of the Indian desert, and Bulochistan, camels are the chief beasts of burden, and are cheap and good. With respect to the other countries, we are to distinguish carriage as it may be, 1st, that of armies; 2nd, that of caravans or of persons making distant journies; 3rd, that of farmers on their own farms, or for the supply of provisions to towns, or distribution of town manufactures in the neighbourhood, or the interchange of commodities, within small or moderate distances. The chief carriage of the Persian army is by mules and strong ponies. The latter are by no means so esteemed as the former, yet by reason of their cheapness are actually found in the proportion of sixty or seventy to one hundred of the whole. All other carriage is but inconsiderable. Bullocks are not used except for dragging artillery, a use they are also put to in the Doorany army. In both countries it would be much more advisable to employ horses. Certain of the Loor tribes employ asses, and officers of rank who may have heavy baggage keep some camels; were it not for these last, the motion of an army would be scarcely impeded by its baggage, for the camp followers who do not in number exceed the fighting men are almost to a man mounted on the sumpter animals of their masters. This constitution of their army must alone give the Persians infinite advantages in a war with Hindoostanee forces, incumbered with multitudes of timid attendants, and impeded by a sluggish baggage. The Afghans, intermediate in situation between those two nations, adopt in part the usages of both, in this important particular, camels however are certainly the chief carriage of their army, which generally makes slow marches. On oc-

casion of emergency, however, it is known to leave its baggage behind and make very long ones. The small armies now on foot on the sides of the various competitors for the throne use, it is probable, more mules and ponies than camels, and perhaps many years may not elapse before the former species of carriage gain much ground; the poverty alone of the soldiery now prevents its more general adoption. Runjeet Singh has made some progress in providing mules for part of his forces, but his situation is not favourable for procuring those of the most serviceable kind.

161. For long journeys the camel is the most economical carriage, and in caravans they outnumber all other animals. There are however some exceptions; the trade to Chinese Toorkistan from whatever quarter, seems to be conducted by means of ponies and horses. Commodities brought by the people of Toorkistan to Cabul are almost all on horses, but such of the inhabitants of this side of the mountains as trade to Toorkistan mostly use camels. The trade from Peshawur to Cabul, and Cabul to Peshawur, is carried on by means of all the various beasts of burden in the country; perhaps an equal weight of commodities is annually transported on camels, mules, and ponies. Some bullocks, originally Indian, bring loads from Cabul, but seldom return, being readily disposed of in Peshawur. Bullocks are little used for long journeys, except in the cases already mentioned (see paragraph 160); a few attend the army besides those of the artillery. With respect to the third species of carriage, it would lead into great details to particularize the usages of all the various districts, for within a short distance is often the greatest diversity of practice. On farms, in a vast majority of cases, the chief carriage is by bullocks. The intercourse between the towns and the neighbouring country, is as much by means of other animals, except in the quarters towards India. The wandering tribes in general have their tents carried on camels, but where, as in the west of Toorkistan and north-west of Khoorasan, they drink from draw-wells, the leathern bucket for drawing water is carried by an ass or a bullock. The tents of the Ymaks in general are carried on ponies and horses, but the Jamsheedus use a good number of bullocks. In the upper Sindh and lower Punjab, asses bring the greatest part of the fuel into towns. Asses bring great quantities of grain from Bajour into Peshawur; in the former country camels are scarcely known, although the soil and climate is not unfavourable; there are still fewer in the moist country of Koonur; asses are of much use in the internal traffic of both, and in the country of the upper Mihmuds. In the plain of Peshawur, bullocks are mostly used in bringing grain

to the town, but camels and mules are employed in longer journeys. In Puklee many mules are used. The internal trade of Toorkistan is chiefly by ponies and horses. In some parts of the east asses are much used, but in Keerategin men transport the greater quantity of goods. Nor is that species of carriage peculiar to this country, but is known in Budukhshan, Durwaz, Kushmeer, and in the countries within the great mountains which bound India to the north. A considerable proportion of the goods carried from Peshawur to Kashkur through Bajour or Punjokhora are for some distance conveyed on the backs of men; it is needless to observe that the roads are of the most difficult kind.

162. The animal most commonly used for ploughing in these countries is the ox, and in some of them no other is used. A circumstance which greatly recommends them, is that no other servant is required besides the drivers, whereas for all the other animals a man is required to lead. On the other hand, a single bullock is but very seldom found equal to this work; but where the soil is light, a horse or camel is sufficient, these have also the merit of greater celerity, which may in some cases be much required in farm management. Accordingly horses are in part used over most of the open parts of Toorkistan, and by the Ymaks. In Muro scarcely any other animal is used. The use of horses in the plough, perhaps, extends to some of the other parts of the north of Khoorasan, but in all other quarters of that vast country it seems unknown, and in the other countries under review, I presume very few instances of it are to be seen. The Khirghizes plough on the Pamer chiefly by means of bullocks of the Tibet species, already mentioned, but in other quarters they use camels. The Kuzzaks employ camels almost solely. The Tureens and Buruhes use both camels and bullocks. A proportion of camels is used in certain parts of the Kokur dominions, and a few in Seeweestan. In Beekaneer and the neighbouring countries, camels are used, but not so much as bullocks. It may be presumed that camels are much employed in the warm parts of Bulochistan, but among the hills bullocks are almost solely yoked. In the neighbourhood of Mooks and Abilazee, places in the road between Candahar and Ghuznee, it is not uncommon to see the fields, which are commonly light, but with a mixture of stone, under plough by a couple of asses. In Seeweestan two asses are sometimes yoked.

163. Bullocks most commonly draw water, whether it be fetched up by a rope and leathern bucket, or by the action of a wheel. Yet are camels sometimes used in the country of Beekaneer, and in others in or near the Indian desert, and always with good effect, one bringing up the bucket from the deepest wells. The Toorkmuns near the Oxus,

water their fields (for they are not ignorant of agriculture) by raising water from cuts which are made from that river, and in this operation they usually prefer the wheel, with a band of water pots, and yoke camels. Such wheels are, towards India, sometimes seen turned by buffaloes. In such quarters of Toorkistan as horses are yoked to the plough, they are also made to draw water, and camels are in use for the latter as well as the former. With respect to the treading out corn, the same animals, camels excepted, are used, as in the respective places where they are yoked to the plough, cows however, although useful in treading out, are scarcely so in ploughing. Goats too may sometimes be seen in Pushing, assisting in the former operation; which in Cabul, Khoorasan and Toorkistan is not always effected by the feet only of the animals, but by the addition of some simple machinery.

164. It must excite surprise to learn that carts are unknown in the greater number of these countries. In the line of the Embassy's march to Peshawur, they were found not to extend to the right of the Indus. There are few, perhaps none, in the dominions of Mohummud Khan on this side the river, but to the south they are used in most parts of Sindh as far as we may suppose their use demands. Carts are but little used in Seeweestan, and not at all in any part of Afghanistan, the remainder of Bulochistan or Khoorasan. In a westerly direction we may proceed nearly to the Hellespont before we see any. Neither are any found in Toorkistan on the south of the Oxus (with one exception) Bulochistan, Kashkur, Keerategin, Durwaz, the Pamer, Kushmeer, or most parts of the Dooab of the Hydaspes and Indus. In the neighbourhood of Bokhara, Orgunj, Samarkand, and Kokur alone are carts used in Toorkistan beyond the Oxus. In Bokhara they are not employed for all the purposes they are applicable to. In this particular, as almost all others, our information is very scanty respecting Chinese Toorkistan. I have been lately informed that carts are very much used in that quarter, and some have as many as six horses yoked to them. The Chinese in Yarkund and the other cities use buggies and tandems, not unlike those of the English, hence there is some probability that the use of the humble, but more useful species of wheeled carriages is not unknown. In most parts of Toorkistan, and probably in many other quarters, great use is made in rural operations of a machine which seems to be a sledge.

(To be continued.)

ART. III.—*Journal of a Mission from the Supreme Government of India to the Court of Siam.*

December 18th.—At half past 1 P. M. left Maulmain. My baggage and presents for the Court of Siam in three boats; and at half past 2 P. M. halt ten minutes at Neaung-ben-tseik, when having ascertained that the elephants (six), which are to meet me at Nat-Kyning, had started about 8 o'clock, we proceeded with the flood tide in a south-easterly direction up the Attran river, passed the villages of Nantay, Keik-poron, Keik-mo-rong, Peikh-hnay-cong, Kan-ta (or Kanaumy), Being-beo, and at 6 o'clock halted for the night at Keik-mare. The banks of the river, which winds considerably through an alluvial country, have been low and wooded throughout the day.

December 19th.—At half past 2 A. M. left Keik-mare with the morning's flood, and continuing the same course as yesterday, passed several rocky (lime?) hills, and at 8h. 45m. halted for breakfast at the village of Attran, near the old city of that name. The neighbourhood of this village is said to be favourable for cotton cultivation, and the teak forests commence in detached clumps on the right, or eastern bank of the river, about Pa-baung, (a village inhabited by Shan elephant hunters), a short way below it. Complaints are said to have been made to the court of Bankok of the number of elephants stolen from that kingdom, a little north and east of the capital, and sold into our territory; some of these hunters have been summoned to Bankok, others have been recalled by the chief of Timmay, to which place the majority of them belong, and the rest are said to be preparing to follow them: in the meantime, strict orders have been issued by the court of Bankok, prohibiting the exportation of elephants from Yahine, (the southernmost of the Laos towns), and the country to the southward. Left Attran at 11 A. M., and at 1 P. M. enter the Zimee river, where it is joined by the Wengeo, their united streams forming the Attran. The Zimee is exceedingly tortuous in its course, the different reaches running to every point of the compass. At 2h. 25m. P. M. halt for dinner, having come from Attran against the stream, which is very sluggish at this season; 4h. 15m. start again with the flood, and reach Kea-en (lotus lake) at 10 P. M., here we halted for the night; the inhabitants of the village are Kareens, who have fled from the oppression of the Birmans in the last year.

December 20th.—Left Kea-en at 8 A. M. on the flood, and reach Nat-Kyeaung, at 10 A. M., where we got the things out of the boats, and

wait for the elephants which have not arrived. Nothing can be more uninteresting than the banks of the Attran and Zimee, winding to every point in the compass, through an alluvial soil with banks of considerable depth, and covered with rich arborescent vegetation to the water's edge. After passing the villages on the first day, nothing is to be seen from the boats except an occasional solitary alligator, gnanah, king-fisher, or snake bird. We met three rafts of timber, in all about 260 pieces, floating slowly down the stream. The river though of great depth, having upwards of three fathoms opposite our halting place, can discharge only a very small quantity of water from the small declivity in its channel, consequent sluggishness of its course, and great height to which the tide reaches up it. Though the most productive river in the provinces in teak, its timber, particularly that of the lower part of the river and near its banks, is held in less esteem than the Irrawadie or the Malabar timber; the depth and great richness of its soil promoting its more rapid growth, and hence diminishing its strength and elasticity; our people have however in the last year overcome some difficulties in the Memlunghe river, which have opened a mine of wealth to the provinces in the splendid teak of that river and the upper Salween, if the Siamese government throw no obstacles in the way.

December 21*st*.—The elephants arrived to-day at noon, having been detained half a day by one of them following a herd of wild ones in the night; we have been employed apportioning their loads, and preparing for an early start to-morrow. The tigers are said to be excessively bold in this part of the forest.

December 22*nd*.—Goonghe-let-tet, 5h. 50m., sixteen miles. Started at 7h. 40m. A. M. leaving the banks of the Zimee, and travelling along a well trodden path used by the timber cutters, reach the Kareen village, Nat Kyeaung, of ten houses, at 8h. 35m., where we were detained an hour in endeavouring to procure guides, all the Kareens declaring they knew nothing of the country a mile south-east of their own village. I had unfortunately no one with me who spoke their language, and though they all spoke Talines, and many of them Birman, they are only to be properly managed in their own language; and it is not to be wondered at, for they have never had any communication with their neighbours for ages, except to be oppressed or cheated. We at last prevailed on three of them to accompany us, who brought us safely to this halting place, protesting to the last that they knew nothing of the road. At 10h. 15m. cross a small nameless stream. 11h. 15m. Goongalay, another stream. 12h. 5m. cross the small stream of

Danoung. From 1h. 5m. till 2h. 5m. travel up the bed of a small stream, then cross the Thaybue; and at 2h. 20m. halt on the bank of a small feeder of the Goonghe, a considerable stream, on the banks of which there was formerly a town of the same name; it runs through a rich and level teak tract, and the timber is floated down it in the monsoon into the Zimee. The path has been good throughout, level and dry at this season, and even in the rains must be very passable; there is but little teak timber near the path, none good, and no sign of inhabitants after leaving Nat-Kyeaung. The soil a rich alluvion, well adapted for the cultivation of coffee and cotton.

December 23rd.—Goonghe, 5h. 40m., eleven miles. Left the last ground at 8h. 10m., and almost immediately entered a teak forest; the trees were nearly all killed for felling, generally of small scantling, interspersed with other trees, and an underwood of small bamboos; the soil generally hard, with small nodules of iron-stone in the paths, which form little water courses in the rains. None of our party knew the proper road, the Kareens to whom I trusted as on former occasions persist in denying all knowledge of the roads in this direction; the head elephant driver having been employed here in dragging timber, had a general knowledge of the forest, we were consequently obliged to put ourselves under his guidance, and with the elephants in front making a road where there was none, reached this halting place, on the banks of the Goonghe mentioned yesterday. The water in it this season, is here twenty paces across. One of the coolies was taken ill with fever yesterday, soon after passing the Kareen village, and as he has not come up, I hope he has returned there. Ten or twelve traders of those who started with us, unable to keep up, are encamped three or four miles in the rear, and as our means of carriage are limited and no rice procurable, or village to be seen for seven or eight days, our want of rice will hurry us on as fast as the elephants can march. I have sent the Siamese interpreter, one mahout, two Kareens, and two bearers for rice, and a guide to the wood cutters in the forest, about six miles westerly of our halting place. The path is nearly a dead level, in some places broad and clear, in others there is scarcely any traces of it; at one time for an hour and a half, had to cut our way through a bamboo jungle; passed two small streams, feeders of the Goonghe, and two small lakes in the course of the march.

December 24th.—Metakut-let-tet, 2h. 50m., seven miles. Were detained looking after one of the elephants till 11h. 10m. at the last ground, and had then to force our way, nearly the whole march, through an underwood of low bamboos, without any signs of a path,

except when here and there, for a short space, some of the numerous wild elephant tracks with which the whole forest is intersected, took the direction we wished to travel. No teak throughout the march. Soil as yesterday firm, and mixed with small stones, but of considerable depth, as seen in the banks of the small streams, of which we crossed three or four in the course of the march. The path, but for the jungle, would have been good, and was dry throughout; our detention this morning enabled the traders and our people (who went in search of the guide, and who were unsuccessful) to overtake us before we started.

December 25th.—Meetakut, 7h., fourteen miles. The whole character of the march and country the same as yesterday, excepting that at 9h. 40m., an hour and a half after leaving the last ground, we found ourselves on the top of a small hill, from which we saw that we were surrounded by low hills, giving an undulating character to the country; and the latter part of the march has been a little less level than for the last two or three days; a few of the teak trees of more considerable size than any we have before seen; crossed during the march five small runs of water, all tributary to the Zimee, and saw in the jungle, marks of all the larger inhabitants of the forest, bison, buffalo, cow, elephant, hog, elk, deer, &c., jungle and pea-fowl, all along the line of our march.

December 26th.—Meetakut river, 1h. 40m., five miles. Were again detained by the straying of one of the elephants in the night, till 12h. 45m. Twenty minutes after starting entered the teak forest from which much of the timber in the Maulmain market has hitherto been supplied, and came on a wide and good road by which it has been dragged to the river, partly by main force by the elephants, and partly on trucks. The teak at first scattered wide apart in single trees, becomes a little more numerous as we approach the river; but they still form a very small part of the forest; the timber larger and finer than we have hitherto seen. At 1h. 40m. reach the river, running in a deep bed in rich soil; though there is a considerable depth of water in many parts of the river, the bottom is so uneven as to prevent the timber being floated down, except in the rains. From this we march in an easterly direction, come again on the river at 3h. 10m. when we cross and halt on its banks, being a considerable distance from any other water. We have been fortunate in obtaining a basket and a half of rice from some wood cutters, at three rupees a basket. The Kareens who still accompany us know the road for the next two days; we shall then for one day have, as in the last few days, to take the best direction we can, when several of the people know the road to Kataintsein,

the Siamese post on the frontier, at least they have travelled in this direction some years ago.

December 27th.—Kyeun-Kyaung-let-tet, 4h. 20m., eight miles. Left the last ground at 7h. 45m. and march generally in the direction stated, though the route has been very tortuous, over broken ground through a forest of tall trees, with an underwood of bamboos so broken down and interlaced by the wild elephants, that our progress was exceedingly slow, excepting for about a mile, when our march happened to lay along a wild elephant tract. There has been no signs of any path throughout the day, and the elephants did not come up till past 7 P. M. Saw only a few teak trees just before coming to our ground, which were nearly all killed for felling, though we saw no stream that appeared adapted for floating them to the river. The soil appears good, though broken by many wild ravines, and water by no means scarce, but no sign of this part of the jungle ever having afforded subsistence to a human being. Marks of the same variety of wild beasts as yesterday.

December 28th.—Near the Zimee, a little above Kyeun-Kyaung, 3h. 10m. A. M. nine miles. Start at 8, along a small path, the same as yesterday; at 8h. 25m. cross the Maz-Pra, or Ko-tor Kuag, a branch of Meetakut, about which there is a good deal of fine teak, and the path begins to be well marked; at 8h. 50m. cross a small stream and an old Kareen clearing; 9h. 40m. cross another small stream; at 9h. 50m. come on the road by which timber had been dragged in the monsoon to the Kyeun-Kyaung, which we reach at 10h. 10m.; passing down in the direction of the stream, come on it again at 1h. 20m., where it joins the Zimee; passing up that river, ten minutes halt at a wood cutter's hut. The Zimee is even at this season of considerable width, and has at this place and season five or six feet of water. We obtain another basket of rice, price three rupees, and gain information about the road between this and Jung-Jung-Khay; a great deal of very fine timber still in this forest close to the river.

December 29th.—Small stream, 6h. 50m., two miles. 9 A. M. left last halting place, where there are the stumps of a teak stockade still to be seen which was erected 1147, (A. D. 1812) by Along Mindora, the grandfather of the present king of Ava, on his expedition against Bankok, but taking a road too much to the eastward got into ravines, quite impassable for people with loads; from their steepness and the thickness of the jungle, we were obliged to return to the ground we had left, and at half past 12 took a fresh departure, and marching along at a short distance from the banks of the Zimee,

halted here at 2h. 40m. The teak here appears to be confined to the valley of the river, as not a tree was to be seen after entering the hills; the road we attempted to find in the morning would have taken us to Jung-Jung-Khay in one day, whilst by the one we are now pursuing, we shall be three or four in reaching the same place. We procured two guides at the last halting place, who had come up to float down timber, but finding the elephants and people they expected to have met here, had returned to Maulmain, their engagement with Mr. Darwood being cancelled, they also were about to return. Their occupations keeping them about the banks of the river, they are acquainted with our present route, and supposed from description they could have found the eastern road, but unfortunately were mistaken, and being very short of provisions, we could not lose time in looking for it. Our party have feasted on elephant's flesh the last two days; the people at the halting place having shot a female the day before our arrival, the flesh of which they were smoking for the Maulmain market.

December 30th.—Maitsalic Kyeung 1h. 30m., three miles. Have made wretched progress the last two days; did not get the elephants, one of which had followed a herd of wild ones, till past one o'clock. We started at 1h. 20m., and after marching ten minutes, had to halt twenty, till the guides went to look for the path, amongst many others, nearly all equally trodden by the wild inhabitants of the forest. At 1h. 50m. proceeded for another ten minutes, and had again to halt an hour for the same purpose, when we a third time moved forward, and at 3h. 5m. reached the Zimee, running a clear stream in a stony bed, with banks in a direction N. 20° W., waist-deep at the ford, and some 150 yards wide; crossed it N. 55° W., and marching along its western bank through the teak forest (of Mr. Bentley) reach this ground on the Maitsalic river, knee-deep, running N. 6° E. to join the Zimee. Here we were obliged to halt for the elephants, as it is impossible to distinguish the path even with help of the full moon; we have only one more day's rice, and shall certainly not get a supply for the next two days.

December 31st.—Small stream, 4h. 20m., eleven miles. Started at 7h. 35m. and crossing the Maitsalic twice, proceeded by a tolerable path through high tree jungle, and enter a narrow valley with a small stream, at 8h. 35m., which in twenty minutes becomes a ravine; along this ravine the hills more or less high, and more or less receding. Our route lay till 10h. 22m., when we recross the Zimee at Waat-tan-ghe (where it has a northerly course) in direction N. 60° E., the stream pretty rapid, and the water about three and a half feet deep; after crossing we waited for the elephants which we had left at

10h. 5m.; they did not overtake us till 1h. 5m. No one of our party having ever marched between this and Jung-Jung-Khay, we had some difficulty in finding the path, which we could only distinguish, amongst the numbers of wild elephant tracks which cross the forest, by the few marks of the traveller's knife on trees at long and uncertain intervals. At 2h. 35m. we lost all trace of these and our path at the same time, which after unsuccessfully seeking for an hour and a half, were obliged to return to a small stream we had crossed at 2h. 5m., and at four halted for the night; some of the people just at dark, discovered the path on the east side of the stream. No teak timber since entering the ravine, on the other side of the Zimee, a good many thengan trees of great size, and other trees very high, with rather fewer bamboos. The wild elephants from their tracks, seem exceedingly numerous in this part of the forest, and the first of our people saw a herd to-day on the other side of the river.

January 1st, 1839.—Halt. The neighbourhood of the innumerable wild elephants has caused us an inconvenience I have feared for some days; one of our elephants joined them in the night, the mahouts having been in search of him all the morning, returned after noon, having lost all trace of him on a bare hill some miles distant. I immediately (after furnishing them with a portion of our very small quantity of rice) despatched them again with other elephants, and to my great joy, they returned about 6 o'clock having reclaimed him. We have of course been constrained to halt here to day; I had however in the forenoon despatched the Siamese interpreter, some bearers, and some Birmans for a supply of rice, to meet us at the next halting place; they will I hope, finding we have not arrived there, come on to meet us, as there is not a grain of rice in camp for breakfast. I have tied up the elephants to night, and shall continue to do so till we are out of the vicinity of the wild ones; this arrangement will enable us to start early in the morning, and give the elephants the whole afternoon to feed, they can then be tied up, and branches cut for them; though they suffer from this plan when long continued at this season, when there is little succulent food for them; we shall in a few days be where we can let them loose at night.

January 2nd.—Karaung-tan. 5h. 20m., fourteen miles. By tying up the elephants last night were enabled to start to-day at 7 A. M. The first part of the march was over a broken country, repeatedly crossing a stream about ancle-deep; the jungle at times a little more open. At 10h. 30m. were much disappointed at coming on the place where our party sent off for rice had slept last night, giving us little hopes of any thing to eat to-day. At 11h. 10m. come on the Meeka-that, running

in a deep ravine, with a high rocky hill E.; travel up its bank, and at 12h. 10m. cross it just below the water-fall, or Jung-Jung-Khay, little more than knee-deep. The fall we saw was not more than three or four feet, but a little higher up there is a fall of much greater height; the stream divides some way above where we crossed, and forming a small island, joins again a short way below; the branches are of nearly the same size, both of which we cross; we then pass up it to the west, and at a short distance from it, at 12h. 20m., cross the Karong-tan, running down to join the Meeka-that; and at 12h. 40m. halt on the east side of the stream, about the same size as the Meeka-that. The people sent for rice have not returned, and the elephants and one-half of the rest of the people have not been able to come up, so that the party here to-night amounts in all to only sixteen or eighteen, and had it not been for a wind-fall of some yams in the jungle just before halting, we should have had nothing to eat; as it was, there were only some small knives to dig them with, and the depth the roots run in the earth is about three or four feet; my tent is also in the rear.

January 3rd.—Three Pagodahs, 4h. 10m., ten miles. Elephants and people did not come up till 8 o'clock, when having breakfasted on the roots mentioned yesterday, and fern-leaves, we left the ground at 10 o'clock, and marching along a good path, over ground a little undulating, with a high precipitous hill east, at 10h. 35m., the jungle composed of high trees and nearly free from underwood, halted at Enganoo, a small run of water at the foot of a descent from the road, a little after one, to dinner; as I was told there was no water at this halting place, and I wished to pass the night here, to enable me to get an observation of the distance between the moon and a star. Started again at 4 o'clock, march along a good path in high tree jungle, with occasional patches of bamboo underwood, till 5h. 10m., where some rocks protrude through the surface and the rocky hills at a short distance east of the path; 5h. 20m. pass some water; and 5h. 40m., just as it was getting dark, lost our path, and with some difficulty by firing muskets which were answered by the mahout (the elephants not having halted as we did), in half an hour reached the three Pagodahs, over broken, rocky, wet ground; the sky became clouded, and we had a few drops of rain till 10 P. M., when the night became beautifully clear. The ground on which the three Pagodahs, so called, though they are only three heaps of loose stones, are situated, is of considerable height, being the centre of the range. The water on the opposite side runs in opposite directions, marking the old boundary between the Siamese and Birmans; the water on the eastern, or Siamese side, falling by the

Thaung-kala into the gulf of Siam, and on the western, or (now) British side, by the Zimee and Attran into the gulf of Martaban. The ground is rocky and barren, only a few stunted trees, some bamboos, and long grass; under a belief that no water was to be found here, we had halted in the afternoon to make our miserable meal, had in consequence been benighted, and tumbled about amongst the sharp, broken, rocky ground near the halting place, where on arrival we found an abundance of good water for a much larger party than ours, which will probably not be dried up for the next two months.

January 4th.—Thaung-kala, 3h. 10m., nine miles. Waited this morning at the three Pagodahs till past nine, when the moon went down, in hopes of getting a distance between the sun and moon, but anxious as I was to do so, I was defeated in my object by a thick fog which rose just before the sun, and continued till after the moon had set. It was impossible to make a day's halt, as the people had already been three days without food, except what they picked up in the jungle, and I did not know when I might expect the party despatched for rice, as we passed their previous night's halting place about noon, the day before yesterday. At 9h. 20m. we started, the elephants having gone an hour or so before; at 10h. 45m. heard some one in apparent distress calling out to the right of the road, and on going to see what was the matter, found a young elephant had taken fright, at some of the people running up behind him, and broken away into the jungle, knocked off his rider, and breaking his howdah and all its fastenings against the branches, had escaped. I sent all the people who could be spared from the other elephants after him, they picked up all his load, consisting of a large carpet (part of the presents) and some muskets, but being unable to see him, we left the things in the jungle, and started at 1h. 25m., intending to make all haste to the halting place, and send the elephants back to look for their lost companion; but we lost the road at 1h. 50m. and we did not find it again till 3h. 20m., when we continued our march, and crossing two or three runs of water came to this ground, on a beautiful mountain stream about knee-deep, and a stone's throw across, running here south-west, and falling into the gulf of Siam, and were much disappointed at not finding the people with the rice; the elephants from the thickness of the jungle in one or two places, and from some fallen trees over a ravine in which they had to march, did not arrive till 8 P. M., when it had been quite dark in the jungle for nearly three hours; they were enabled to find their way (fortunately the path was pretty well marked towards the end of the march) by the mahouts carrying in front immense torches of blazing bamboos in

a bundle over their shoulders, which gave an exceedingly picturesque effect to the whole little encampment. It is now impossible to send back for the carpet, and should the wild elephants come upon it in the night they will certainly tear it to pieces, our lost elephant will also have an opportunity, and as I believe he has not been in bondage above eight or nine months, he will probably be admitted into the herd, and having nothing to distinguish him but his belt, (should that fortunately not be torn off in his rushing through the jungle,) I fear we have not much chance of recovering him. I shall however halt here to-morrow, send one of the horses for rice to the Siamese Kareen village of Kenk-khaung, and all the elephants after the fugitive one. The path to-day has generally been good and level, through a high tree jungle, and occasionally in a ravine, always with high hills at a short distance, and our course more direct than on any previous day.

January 5th.—Halt on the Thaung-kala. About 4 P. M., the party sent for rice returned with a most welcome supply of two baskets, enough for two meals for the whole party; the Siamese interpreter to whom the money was entrusted, after a vain attempt to get the others to join him in withholding it from the villagers, separated from them and has not yet returned; the head mahout who was of the party, bought the small supply we have obtained with his own money, and the Tsokay of the village promised to bring us an elephant load to-morrow; he told the mahout the king would punish him if he received payment for the rice, but he would take what I chose to give him as hire for his elephant. I had already despatched two elephants for the load of the fugitive one, and immediately the rice arrived I sent the three others with the head mahout and a supply of rice for three days to look after him, with directions to return in that time, whether they recovered him or not.

January 6th.—Halt at Thaung-kala. About half-past 4 the Siamese interpreter returned with the Tsokay of Thaung-kala, who according to his promise to my people yesterday, brought me three baskets of rice, some salt and chillies; he received one rupee for the rice, and I gave him and the chief person who accompanied him two cotton handkerchiefs each, with which they were very well pleased; he had accompanied some Siamese officers with a letter to Maulmain some time ago, and professed to recognize me, I believe however I was in Calcutta at the time he refers to. I had just given up hopes of him, and supposed the interpreter, from what I had been told yesterday by the people who accompanied him, had very probably gone off to Tahine, where he has a wife and children, especially as he had received an

advance of two months' pay, and ten rupees for the purchase of rice; he says, he supposed (I know not on what grounds) we were at the three Pagodahs, and was on his way thither, when he saw the party looking after the lost elephant. The supply of rice was a most seasonable relief to the people; five or six Madras men who are not accustomed to jungle food, had yesterday considerable derangement in the bowels from living on the green fern leaves and roots, it has nearly gone off again with the improved diet.

January 7th.—Halt at Thaung-kala. The party sent after the elephant returned at 8 o'clock this morning, and as I had feared, without him; the wild elephants are so exceedingly numerous in this part of the forest, that from the first I had little hopes of recovering him; a short way in advance of the place I had followed him to, he had rushed down a ravine so steep and rocky that the other elephants could not follow him; they went round, and coming on his track on the further side, followed it till they came on a herd of forty or fifty elephants, and our smaller one would not approach them; the head mahout on the only one that would, broke the herd in hopes of seeing our lost one, as the wild ones will not admit one escaped to mix with them; he however was not seen, and in hopes that they might come on him making his way back the road he came, and in that direction, they went back as far as Jung-Jung-Khay near which they fell in with two other large herds, but had no better success in the search, and from the time they fell in with the first herd, they of course, in the numerous paths made by the wild ones, lost all trace of his foot prints. The interpreter has just told me he saw a Tsokay of Pra-Soowan, who has charge of this district, to whom he gave an account of the number of people, elephants, &c. I had with me, and told him I was sent on a mission with a friendly letter to the Court.

January 8th.—Neauny-hen, stream near a Kareen village of the same name, 5h. 10m., fifty miles. Left the Thaung-kala at 8h. 30m. our course a little more to the southward than the general direction of our march hitherto; path nearly level, but apparently between two ranges of hills, and crossing four small runs of water, feeders of the Thaung-kala, 11h. 15m., the path lay near the foot of a high (5 or 600 feet) precipitous rocky hill, bearing N. 40° W., with its steepest side towards the south eastward; 12h. 20m. came to an old clearing and cotton field, with a small run of water; we halted, seeking the road, half an hour, from this in five minutes we reach Alanday Kyung, running S. 6°, 5°, W. nearly as large as the Thaung-kala which

it joins. The Thaung-kala is joined near the same place by Meene-Kyning, which rises in the hills near Yea, where the three take the name of Ka-tain-tsein; further south the Mag-nan-noi, which rises in the hills towards Tavoy, joins it, and though smaller gives its name to the united stream. At 1h. 30m. we cross in a few minutes a rather steep hill bearing S. 60° E. near the eastern part of which a road runs N. E. to Kenk-Khaung, the residence of the Kareen Ank of this district; south of his village he has about seventy houses under him, who pay each a tax of fifty viss of cotton. At 3h. 35m. having halted an hour, reach this ground. Just before halting, the Taung-thoo traders who accompanied me, and who had come on to this village yesterday, met me with a complaint against the interpreter, who had told the villagers they were not part of the mission, and not to sell them any rice; he must have heard the complaint, for one of the coolies had given him half a rupee to bring rice, this he gave to the Kareen, and directed him to tell me that he had said they were traders, and to sell or give them rice if he had any to spare; the Kareen gave this version of the story when I inquired into the complaint, and as soon as he got home, the interpreter went and demanded the half rupee or a basket of rice; the Kareen returned the money, and then told the truth, expecting I would make the man pay him back the money. I shall however henceforth supply the whole of them with rice, which will save a great deal of trouble.

January 9th.—Papan Kyuing, 2h. 10m., seven miles. The elephants which were unable to come up last night, have again obliged me to take up my quarters under a bamboo bush; they did not overtake us till 12h. 10m., when having hired an elephant from one of the Kareens, to carry the load of the lost one, agreed to pay the half of his price if they recover him, which they expect to do. We started having procured three days rice, and given a pass to the Taung-thoo traders who separate from us here, and propose joining again in Bankok. The country was a good deal broken throughout this day's march, and the hills apparently at no great distance, but the jungle so thick that we could not see twenty yards in any direction; we crossed two small streams immediately after quitting the last ground, and at 12h. 55m. Raja of Kyuing, knee-deep, passed two or three other small streams, and at 2h. 30m. halted at this one, to enable the elephants to come up, which they did just before dark. The Kareens have been civil and furnished us with rice, the only thing they had, as they rear no poultry nor pigs. A Taline visited us this morning from one of the military posts, the name of which, and apparently the name only, is still kept up; he

put some questions to us relative to our number and arms, but no hint was dropped of delaying us; some mystery was made about the road, and an attempt made to induce me to go by Tauny-Kahoung road, but assuming a perfect right of choice, I merely intimated my intention of going by Ta-kanoon, which is shorter, and nearly level, whilst by the other the hills are very steep. One of our Kareen companions is at this moment giving most ludicrous and savage imitations of the dances of the Siamese, Taline, Birmans, and Sawas by the fire-light.

January 10th.—Sa-di-diang, 3h. 10m., nine miles. Start at 7h. 55m. and crossing the small ravine, in which the Pa-pan runs, proceed along a small reedy valley, through which the road has only been allowed to pass since our peace with Ava, before which time it ran east of the hills. At 8h. 10m. we passed a small trench, said to be the site of an old Siamese stockade, and the elephant pits (Ka-tyné-tsein,) from which the river and a frontier post and stockade on it take their name; at this post during the whole fine season was kept a force of from eighty to one hundred Talines, and twenty-five in the rains; the whole of this path is said to have been strewed with Birmese corpses in 1147 (A. D. 1812) when Along Mendora invaded Siam; his force was marching in an extended line, almost from Thaung-kala to Ka-tyne-tsein, when the Siamese broke his line near Neaung-ben; the king with the rear fled, leaving the van in the hands of the Siamese, who with the barbarity always displayed by both nations whenever they had an opportunity, tied them five or six at a time to the trees and speared or shot them. At 8h. 40m. cross the lesser Ka-tyne-tsein river, knee-deep, from which the country is more open to the west, the hills to the eastward continuing; at 9h. 35m. cross the Ka-tyne-tsein, over the saddle flaps, some six miles below the old stockade now given up; 9h. 50m. cross the Paway, knee-deep, falling into the Ka-tyne-tsein, on the banks of which we fell in with a herd of wild buffaloes, one of which the Kareens wounded, but he got away; at 10h. 40m. enter the clearing of Sa-di-diong, the name of the Tsokay, pass two small villages both bearing his name, and halt here in the same clearing at 11h. 10m. We met some Kareens to day, who found fault with our guide for bringing us this way; he answered that we knew the road, and would not come by the hills. Our present halting place is one of Pra-soo-one's villages, his people amount to seventy families, paying a duty yearly of fifty viss of cotton, carrying it as far as Camhoorie, for which they may make a money payment of five Siamese rupees (about six rupees and a quarter Madras) they have also to find carriage and food for officers passing this way; they met the chief who came to Maulmain last year at Ta-

kanoon and took him with provisions as far as the Meeka-that. There are forty men liable to be called on for the public service, and thirty exempt from youth, age, or other disability. Pra-soo-one receives 60 rupees, each of the Thooghees 12, and one or two Key-danghees 6 per annum from government; the Thooghees and Tsokay are excused the tax. Every Kareen I have asked, and I have asked a great many, have come from the Martaban district, at some period or other, to escape from the Birmans; all the grown men and some of the lads speak Talines fluently. Three of the people ill with fever to-day from the night dews and cold.

January 11th.—Jungle, small streams, 3h. 20m., nine miles. Left Sa-di-diong's village at 9 A. M. and crossing the stream, proceed till 9h. 30m. when we ascend a rather steep hill for eight or ten minutes; at 10h. 20m. 10h. 40m. and 11 o'clock cross three small clearings and a village, and three small streams; at 11h. 40m., after another ascent, saw to the N. a range of high hills running E. and W., halted here at 12h. 30m.; road generally good but must be now at some elevation; passed at a "*call*" distance from a lake of two gun-shots long, said to be full of particularly large alligators.

January 12th.—Oulaung 3h. 30m., eleven miles, started at 8 A. M. and march along the somewhat level top of a hill for half an hour, with hills (which we can see from this elevation) on all sides, at 8h. 30m. descend for ten minutes, when we enter a narrow valley or rather ravine, along which the path lies in high tree jungle and bamboos; crossing four or five small streams, at 9h. 20m. ravine opens a little, and we pass an old clearing; at 10h. cross the Taung-Kapauny, a stream of about half a leg deep, then march twenty minutes or half an hour in a ravine, in its bed or close to the brink; at 10h. 50m. pass an old village, and an extensive clearing; at 11h. again enter the ravine, which continues to near this Kareen village of Oulaung, so called from a small mountain torrent of that name, and on the bank of which we are encamped. The path is good at this season, and well frequented; in the rains it must be soft and muddy in some places, but perfectly passable, and the Kareens say it is used at all seasons. The guides from the first village of Neaung-ben left us at Sa-di-diong, and those from that place left us here; the inhabitants of this village also speak Talines, and most of them are from the Martaban province. The Thooghee is from the old city of Haundro; the tax is the same as that of Pra-soo-one (to whom they are not subject) but I could get no account of the numbers, the Thooghee says four or five families, but from the extensive clearing, there are proba-

bly more; as they have no market for the paddy or cotton, they probably cultivate no more than enough for their own subsistence, clothing, and tax; they almost all possess elephants; a female one is worth from 80 to 180 rupees, the males are somewhat dearer.

January 13th.—Way-pee, 2h. 35m., eight miles. Left the last halting place at 9h. 20m. and crossing the Oulaung three or four times, proceed along its banks; at 10h. pass a small clearing, and at 10h. 50m. ascend for five minutes a stony hill, after crossing which the ground is broken till 11h. 30m. when there is a small space more level, with a high range (6 or 700 feet) of hills running away north on the western side of the Katern-tsein or Mime Kyning, which we cross here, at Ta-ka-noon, a Taline post of three or four houses and two large granaries, one without a roof, and neither having any grain in them; indeed the frontier duty is now a sinecure. The chief of the post was an uncivil old Taline; he took down the number of the people, muskets, elephants, horses, and a rough list of the presents, which detained us till 12h. 25m. when we crossed the river waist deep, which occupied a quarter of an hour, continued our march till 1h. 20m. when we halted on the banks of a small stream near a Kareen village; had some discussion with the people at Ta-ka-noon about the road; they insist that the eastern road from this to May-nam-noi has not been used for some years, and that it is two days march from this place; the western road is well frequented, and also occupies two days; it is inhabited by Kareens, and level, which the other is not; we have consequently come the western road, for which they furnished us with a guide, a simple little old fellow, whose head I have decked out in a gay handkerchief, and out of whom I think we should have got the truth, had they been attempting to impose on us about the roads. The elephant hired at Neaung-ben village returns from this, where we get another; path to-day pretty good, altogether amongst the hills.

January 14th.—Dat-katein, 4h. 20m., thirteen miles. Started at 8h. 25m. and crossing a hill of some height, come on the river at 9h. 25m. running in a ravine, perhaps 300 feet below us, near which our route lay, up and down hills with gradual slopes, and passing two old clearings, about 10h. enter the May-nam-noi district, at 11h. pass a Kareen village, where we obtained the first fowls we have seen since leaving the last village in our own territory; at 12h. 30m. leave the river, near and above which we have marched all the morning, entirely amongst the hills, a high range of which hills run nearly north and south on the other side of the river, beyond which lies the eastern road before mentioned, which the Kareens have deserted, and come west since we have occupied the provinces; at 1h. 30m. come

on a stream of water ancle deep, which after running along the road and overflowing the jungle for a short way on both sides of it, disappears most unexpectedly through the apparently solid earth; near this we are obliged to encamp, muddy as the water is, there being no other within three or four miles; elephants come up at 6 P. M.; the path to-day has been a succession of hills of more or less elevation, generally near the river, which often runs in a ravine with an occasional platform on which paddy or cotton have within the last few years been cultivated by the Kareens, who say that till after our late war with the Birmans, this part of the country, as being too near the frontier, was not inhabited, and consequently this road never used; we are now only five or six days from Tavoy, as the Kareens travel.

January 15th.—Soo-gua, 8h. 40m., two miles. Were again detained till half past 4 P. M. by the straying of one of the elephants which had crossed the river in the night, and was found about two or three miles on the eastern side of it; started immediately, and came to this village, it being impossible to proceed, as it was very dark, and the path through a high forest not being distinguishable; we had a high range of hills to pass on leaving the last halting place.

January 16th.—Ke-dean, 3h. 50m., twelve miles. Started at 9 A. M. and marching through a continuation of the bamboo jungle in which more or less it is intermixed with jungle trees, we have marched with little interruption all the way from Nat Kyeaning; we have seen no teak on this side of the hills, nor have I found the Gamboge, Tola, or Sapan tree, all of which I had expected to meet with here, the former are said to abound near the sea-coast, and the last is found in abundance on the See-sa-wet river (two days east of this) which falls into this river near Camboorie; the Taline refugees and captives are employed in cutting it annually two months in the year, but in transporting, collecting, and carrying it to Bankok, they are always occupied six months, and are obliged to furnish to the king fifty pieces, four cubits long, and a span and a half thick; for any above the proper quantity they have an allowance of 1 tickel, for 50 viss, and any deficiency they must make good; the selling price in the market is 1 tickel a piece; they may compound for this service by paying 20 tickels. I heard to-day of some tyrannical restrictions on the internal traffic of the country, which I shall hear more about at May-nam-noi, where some of the exactions are made. A story is told as a good joke of two officers who were sent up to Taline lately to inquire into and punish those engaged in stealing elephants, which are sold at Maulmain; on the night of their arrival the two elephants they brought with them from Bankok were stolen, and have not since

been heard of; the thieves of Bankok are said to be perfect in their calling. The path to day has been more level than we have travelled since leaving Sa-di-diong's village, and open to the eastward, the western hills continuing. We have passed some small Kareen villages with their clearings, crossed one stream of water, and passed at 10h. 30m. a spring from a rock, which after running in a small stream for a few hundred yards, is lost in the same way, as that near which we encamped on the 14th; at 1h. 40m., we passed the paddy and cotton fields of this village, the most extensive we have seen; the cotton now ready for gathering, very good, long in the staple, and pods large. At 2h. halt near the village of Ke-dean, of six houses. Elephants came up at 6 P. M. Saw at Kenny Ena (so called by way of distinction having a Kenny or convent) a very handsome elephant, with tusks at least 7 feet long, belonging to the Poonghees.

January 17th.—Roye-tsong, 3h. 10m., nine miles. Started at 10h., having been again detained by the same elephant which crossed the river two nights ago; march along a jungle path, the same as before, pretty level throughout, but rocky in the first part of the march; passed only one run of water, but a considerable extent of paddy and cotton ground, in all eight clearings, the last of considerable extent. None of the Kareen villages I have seen or heard of in this part of the country contain more than five or six houses, generally only three, but the houses are long, and several families live under the same roof; each family has however always a separate ladder up to the long verandah which runs along the front of the house opposite their own compartment. There are here, as in the Tavoy province two tribes of Kareens, whose languages are different, but intelligible to each other. About two miles from this halting place we passed the Kareen village of Ka-way, at least the female portion of the inhabitants are Kareens, the husbands are Talines, and were on duty at May-nam-noi; some of the gold washers who are sent out annually by the king were in the act of pillaging their house, as we passed; our approach saved the poor creatures' little property, though all Amhoo-dans, or people employed by the king, whether in cutting timber, washing for gold dust, or what not, receiving no pay, commit larceny by the royal licence. The present depredators were Laos people, though the Talines who are employed in the Sapan forests and the king's troops have all the same privilege; the order extends only to provisions, but nothing is said to come amiss to them, and the small officers; for the Talines who are employed as soldiers are the wood cutters, and have a boat following them the first few days on the river, which when filled with plunder they send home to their fa-

milies; villages in their line of operation are likewise exposed to their tender mercies. The line of our march has been at no great distance from the river, and on its banks we are encamped to night; we have all day been surrounded by hills on all sides, except to the north-west, the jungle a mixture of trees and bamboos as heretofore; the only tree of any value we have seen is the Kanean, or oil tree, a considerable number of which we have passed in the last two days, towering as they always do far above the highest trees in the forest, with their beautiful straight stems and light green foliage; many of them reach a height of fifty or sixty feet without a branch.

January 18th.—May-nam-noi, 2h. 50m., nine miles. One month from Maulmain. I had calculated on being in Bankok in twenty days, and we are still eleven days from it; we have lost several days, by the loss and straying of the elephants, and want of guides in the uninhabited forest, which it has been the policy of the Siamese and Birmans to keep between them. Had all circumstances been most favourable, it would have been impossible to have accomplished it in any thing like the time I anticipated, travelling as I have done with elephants, and obliged for days to cut away the interwoven branches to allow them to pass. Left the last ground at 8 A. M. and travelling for about twenty minutes through the old clearing near which we had encamped, reach the river near which we march for ten minutes, when the path takes a direction more to the westward, and we commence the ascent of the hill we have seen to the S. W. of us for the last three days; the passage of the range occupied about an hour, the path, after those I have travelled to the N. E., by no means steep or difficult; at the bottom of the hills to the southward, after crossing, we came on a path more travelled than any we have seen since leaving the Meta-keet teak forest, leading the west to Tavoy, which may easily be reached from this with elephants in five days, the road is said to be generally hilly and difficult in some places; at 10h. 20m. after passing a new clearing we came on the river again, where we cross and halted here in a shed prepared for us on the shingle (its bed) by the Myotsa of this place, who soon after we halted came to my tent, and remained for upwards of an hour; he brought a basket of rice, some vegetables, dried meat, cocoanuts, &c., for which he refused to receive payment; about 1h. 30m. the elephants came in. The May-nam-noi, from which the lower part of this river now takes its name, has its source in the hill somewhere east of Yea, and falls into the Dayeik, or Dareik, by a deep rocky ravine of not more than a few yards wide, opposite the present small frontier post of the same name. The old city

of Dayeik, or Dareik, of the old maps, is situated on the banks of the latter stream, about half a day above the junction of the two; it is now destitute of inhabitants, but as we are much less troublesome neighbours than the Birmans, the present Myotsa, who is a Taline from Kaling-Aung in the province of Tavoy, has received the royal order to re-establish it with Talines, who he says will be allowed to bring their wives and families here with them; this is however in my mind very questionable, for the king with good reason, fears the Talines would return to their own country if they could once get so near it, with their families. I here found six thugs who arrived fifteen days ago, having made their escape from the Tavoy jail; I requested Myotsa to give them in charge of the Siamese officer now on his way from Bankok to Tavoy, promising the allowance of 10 rupees a head for them when returned to Tavoy; he said he could not give them up without a royal order, and if he could, the officer would probably not receive charge of them; a good deal was said pro and con, and he at last agreed, at my suggestion, as he could not take care of them (having only come here to meet me, and see to my provisions, &c. and being again about immediately leaving to return to Be-lank-Kyeung to wash for gold) to send them to Camboorie, as it is probable I shall there meet the officers who annually visit Maulmain and Tavoy from Bankok. I declined receiving charge of them, having no means of preventing them making their escape, and told him I should at all events demand them at Bankok, and he must hold himself answerable that they were forthcoming, this he readily promised, and was altogether very friendly and civil; he also provided me with a boat, in which to send some of the heavy things, and some sick people to Camboorie, at which place it will arrive at the same time that we shall, the river being so tortuous that it takes five days with the stream to reach Camboorie from this place. In the course of the afternoon some twenty boats with the Laos people from Chandapoorie, who were taken prisoners by the Siamese in their cruel destruction of that place about twelve years ago, passed up on their way to the Belank river to wash the sand for gold; last year was an unsuccessful year; the number of people employed amounts in some years to 2,500, they are employed three months, and are ordered to produce a maximum of one tickel each of gold, all over which they are allowed to keep; some only get a half, some a quarter, others less; they are all sworn to give in all they have obtained on their return to Bankok; few make up the tickel; they have the same licence as to provisions as the Taline wood cutters, and it was a party of them who

plundered the village near our last halting; the old Myotsa came after sunset with an invitation for me to stay here two or three days; I was however told he only wanted the credit at Bankok of having been civil to me, I accordingly, which I should however have done under any circumstances, declined remaining, and pressed him again about the convicts; he repeated his promise to send them to Camboorie.

January 19th.—Bang-tee, 4h. 6m., twelve miles. Having started the boat with the tindal, and some of the heavy presents, and discharged the hired elephant, left our halting place at 9 A. M., and at the top of the bank passed the village of May-nam-noi, consisting of four miserable bamboo houses, that of the Myotsa not to be distinguished from the others, and surrounded by the remains of the old stockade, which has not been repaired for many years; proceeding not far from the side of the river, through a bamboo jungle and over broken ground, passed a small Kareen village at 9h. 35m., and at 11h. 15m. cross the river (now named May-nam-noi) running here N. 20° E. on a sand bank in the middle of it; after crossing the river saw a few teak trees, the first on this side of the hills, and had a glimpse of a herd of twenty or thirty wild buffaloes, noble looking animals; at 1h. 40m. halted here in a thick jungle, surrounded by hills, on a small brook, which passes through a ravine to join the May-nam-noi; path has been good all day, particularly in the teak forest; gave the old Myotsa who has been exceedingly civil, a small carpet at starting this morning.

January 20th.—Weing-wee, 4h. 10m., nine miles. Started at 8h. 20m. and march for an hour over broken irregular ground, surrounded by hills which frequently approach so close as to form rugged ravines; we then came on the bank of a small stream, or rather a chain of lagoons, where we waited an hour for the elephants to tread down the strong reeds, of twenty or thirty feet high, with which the narrow ravine is filled to the foot of the abrupt, broken stony hills, to enable us to pass; this continued till noon, where again, after a short ascent, we came amongst the stony ravines and narrow valleys of the limestone hills; at 1h. 30m. came to a small clearing, and at 2h. halted here near a deserted Kareen village; the family only removed a few yards, and built a sand pagoda three feet high to propitiate the Nâts, having been frightened away by the very ominous circumstance of some mushrooms sprouting up in the fire place. The path to-day has been the worst we have travelled, which is accounted for by the people from all the communication between Bankok and May-nam-noi being carried on in boats; if more frequented it would of course be better, but no traffic could make it a good road; there is another road on the eastern side of the river, which the Myotsa of May-nam-noi told our

guide was the best of the two, but water was scarce by that route; the guide told us he did not know the other road, and so brought us by this one, it however turns out that he does not know this one either, and has to trust to a boy who came to accompany him back to his village. Had a visit from a tiger last night, strange to say the first since leaving Maulmain.

January 21st.—Ta-ta-kan, 4h. 30m., thirteen and half miles. Started at 9h. and ascend gently along a pretty good path for half an hour, where an equal descent brought us to the bottom of the low hill, where crossing a small stream springing from the rocks close to the road side we enter a small level, covered by prickly bamboos; the eastern hills recede here, and our route lay near the foot of those to the south-west till 12h., when ascending the debritus (nearly all the hills to this have been limestone) at the bottom of the hills which are composed of red sandstone, very steep, and perhaps 700 feet in height, march along a rocky path, and through a short ravine, crossing one small run of water, till 1h., where we again came to the level, reaching to the river, across which our route lay till 1h. 45m., where we halt on the western bank of the river opposite Ta-ta-kan; the Myotsa, for it is still dignified by the title of city, having once I suppose been entitled to it, came over immediately and invited me to a Tay he had erected for me close to, or rather over the water on the other side; as however an unnecessary loss of time would have been caused by crossing the river, the best road being on this side, I thanked him for his attention, but declined crossing the river; he was satisfied and very civil; he brought some eggs, cocoanuts, and a basket of rice, for which he refused payment; he was born here, but his father was Myotsa of Maulmain, in which he had about forty houses in the time of Tsen-bue-shen, son of the great Alom-pra who ascended the throne of Ava about 1744; he receives sixty tickels a year from the king, and is one of nine Myotsas under the Camboorie May-won, six on this and two on the See-sa-wet, and one between the rivers, all Talines, except Pra-sa-one of Kienk Khaung, who is a Kareen. The Kareens are said to amount to 1,000 under Camboorie, who pay each fifty viss of cotton; the village of Ta-ta-kan contains only seven houses, and the stockade, which was of bamboos, is quite in ruins; the river is here about a stone's throw and a half across, about five feet deep, and very sluggish, with high banks on both sides. The path to-day has been good, and generally level; from this there is a path west of Tavoy; our boat and also the six thugs have passed down; of the latter I am told there are eleven more at Camboorie.

(To be continued.)

ART. IV.—*Remarks on the Geology, &c. of the country extending between Bhar and Simla.*

To G. R. CLERK, ESQ.
Political Agent, Ambala.

SIR,

In reporting my arrival at Ambala, I beg leave to lay before you an outline of the route I have followed, and of my proceedings. From Ambala I proceeded to Bhar, and from thence traversed the Pinjore valley as far westward as Nallaghur; I then ascended the mountains en route to Ballaspore per Ramghur. In this tract I passed over a series of rocks, consisting principally of sandstone, slate clay, limestone, and trap, a particular account of which I shall afterwards take the liberty of laying before you. Close to Ballaspore I crossed the Sutledge, and proceeded along its banks for some distance. Being still unsuccessful in finding an out crop of coal, I prosecuted my search towards Mundi.

In the Mundi territory, near to the village of Tuttepore, coal occurs, agreeing in mineralogical characters with the canal coal of Britain, &c., and if it could be found in quantity, would be well adapted for steam vessels, &c. I regret however to state, that the advanced state of the season, and other untoward circumstances prevented me from carrying on my investigations.

That coal may occur here in quantity, is probable from the circumstance of its being found in the same formation, and associated with the same rocks as the coal beds of Britain, &c.; and the specimens which I have brought to Ambala, equal to a maund, shew that it will be well adapted to the purposes for which it is so much required. I hope therefore another opportunity will be granted, in order that I may finish my examination, seeing that there is so much probability of success; and if I am successful, I might then direct my attention to the route by which the coal might be transported to the banks of the Sutledge. I would feel particularly indebted, if you lay my statement before Government, and if in accordance with your views, with a request that leave may be granted at some future period for finishing my inquiry.

I have, &c.
(Signed) W. JAMESON.

AMBALA,
30*th Jan.* 1840.

(True Copies)
(Signed) G. CLERK, *Polt. Agent.*

Report.

The observations which we are now about to offer, being made during the most unfavorable period of the year, viz. July, scarcely a day passing in which our investigations were not interrupted by rain, are far from perfect; we hope however when the season is more favorable we will be allowed to resume them.

In the mean time our remarks will be principally confined to the country extending between Bhar, and a few miles beyond Simla. By means of the road sections and the numerous streams which occur, the country here has been well opened up, rendering its examination comparatively easy and satisfactory in general, in many places however, from the various alterations and dislocations, difficulties of no ordinary nature are encountered.

The field which we are now about to enter on, although frequently trodden by travellers, has never as yet engaged the particular attention of any geologist, a remark which applies nearly to the whole of the Himmalehs. Thus it has been lately remarked, "*We possess but little information as to the general direction and dip of the strata of the Himmalehs; even the principal geognostical features of the various formations are scarcely at all known to us.*"* No doubt some remarkable statements have been made, and none more so than those of Mr. Gerard, who mentions that he met with fossil shells, in alluvium, at a great height, as fresh and entire as if they had recently emerged from their *own* element; and that just before crossing the boundary of Ladak and Bussahor, he found a bed of *antediluvian oysters*, clinging to the rock as if they had been alive, and that at 16,000 feet above the level of the sea. Well might the author of the Geognosy of India conclude his remarks on the above, with the observation, that verification of this is expected.† It is a statement truly remarkable, and well worthy of the attention of future travellers. In an address lately delivered to the Geological Society of London by its late distinguished president,‡ we have the following remarks, "that Captain Grant in his account of Cutch, and Mr. Malcolmson in his description of a large portion of the Indian peninsula, have not ventured to call strata which they have examined, by the names which describe European formations." If any thing has been proved by geological investigations, conducted in the different quarters of the globe, it is, that in every country the rocks composing

* British India, vol. III, p 326. † British India, vol. III, p 326.

‡ Addressed to the Geol. Society, London, Feb. 1838, by the Rev. William Whewell.

the older formations present such a similarity to each other, as to render it impossible to point out any specific distinction. Thus Humboldt has made this remark, in regard to the rocks occurring in the Andes,* discovering no difference between them and the European of the same comparative ages. The same remark has been made† and pointed out to us by Professor Jameson, which is amply verified by the extensive geological collection brought together from all quarters of the world, consisting of upwards of thirty thousand specimens deposited in the Edinburgh Royal Museum; nor have we met with any rocks among the Himmalehs, differing from those we have seen in Europe.

That the newer formations exhibit in different countries, different characters, we were entitled, a priori, to infer. Thus the American tertiary deposits, as has been proved by the researches of Rogers, &c., are quite different from the European; but it has been shewn from the first time these deposits were described, that they, in their distribution, were circumscribed, hence the name given to them by their discoverer Wemer, of local deposits.‡

In extent, the Himmalehs are calculated to be upwards of 2,000 miles, running in a north-east and south-west direction. In such a vast extent of mountainous country, we have the individual mountains assuming all variety of forms, varying according to the nature of the rocks; thus we have peak-shaped, conical, dome, round-backed, saddle, table, &c. To pay attention to the form of mountains in connexion with the rocks which compose them, is of the greatest consequence, it being a well known fact that the shape varies with the rock, and an experienced geologist can, with a good telescope, distinguish, and that too with great accuracy, what a distant country may be composed of.

From the different countries through which this mighty chain runs, it has received various names. Thus its continuation to the west has been called Hindoo Cosh, which by Humboldt is considered as the continuation of the Kuen line; of the Macedonians, it was the Emodus; and the Imaus of Pliny; it probably also, in those days, was called Himmalehs, as the Greek title was borrowed from the Sanscrit.§ In its prolongation to the eastward, according to Colonel Kirkpatrick,

* Humboldt on the superposition of rocks.

† Appendices to Capt. Ross and Parry's Voyages, and Cabinet Library, vols. Polar Regions, Africa, &c.

‡ Cuvier's Theory of the Earth. By Professor Jameson, Notes to 5th edition.

§ Journ. Geograph. Soc. vol. IV. p. 63.

it is called Humla to the north of Zumila, and beyond the Arun, according to Hamilton's map, appended to the History of the Goorka war, the Harpala mountains. Klaproth and Abel Remusat have collected from Chinese writings, the continuation of the chain in the snow-clad peaks to the west of Young-Schan. These turn abruptly to the north-west on the confines of Hon-Konang, advancing ultimately, according to Von Humboldt (who seeks in description, geography for the evidence of the elevation of mountain chains on longitudinal fissures) to the sea, and terminating in the island of Formosa.* We shall afterwards take an opportunity of inquiring into those views of Humboldt, and point out the observations upon which they are founded, being interesting not only to the geologist, but also to the geographer. To make a geological survey of such a vast extent of country, even if permission were granted to traverse many of those tracts inhabited by barbarous, half civilized, and jealous tribes, is a vast undertaking, and would be the labour of many years. The researches of Humboldt, Ehrenberg, &c. have laid open to us a great part of western Asia; of the countries between it and India proper, we possess but little information, and that we owe to Burnes, Bell, Sterling, &c.; we have here therefore still a great desideratum.

For many years the Himmalehs were considered the highest mountains in the world, lately however it has been proved by an observer of well known accuracy, Mr. Pentland, that they are surpassed by some of the peaks of the Andes; of the passes, the lowest, the Tungmug, is calculated to be 13,739 feet, and the highest, north-east of Koonawur, is 20,000, which allowing the culminating points of the chain to be 28,000, would give a relation of the main height of minimum of crest to the culminating point of $1 : 1 : 6\frac{6}{8}$;† Humboldt many years ago reckoned it at 1 : 1 : 8.

In regard to valleys, it has been stated, that the direction of the *principal valleys* is in general at right angles, or perpendicular to the central or high mountain chain; whether this is the case in regard to the principal valleys of the Himmalehs, is a question; at present we are inclined to believe that they are not, and that they are parallel to the central chain, and thus forming those kind of valleys properly denominated *longitudinal or parallel.*

In groups of chains of mountains, as in the Himmalehs, it has generally been shewn, that there is a central or high mountain chain,

* Journ. Geogaph. Soc. IV. p. 63.

† Journ. Geograph. Soc. p. 63.

from which shoot at right angles smaller chains, named *principal chains*, and that between these the principal valleys occur; subordinate to these, we have other mountain chains, running at right angles, or perpendicular to the *principal*, and termed *secondary chains*, and the valleys between these, *secondary* valleys. That however does not appear to be the grouping of the mountain chains among the Himmalehs. Here we have the principal, secondary, tertiary, &c. chains running parallel, as already mentioned, in regard to the valleys to the central or high mountain chain;* as examples of valleys running parallel to the central chain, we may give the Dehra Dhoon, and the Punjore Dhoon. The appearance presented by many of the small lateral valleys is remarkable, occupying the upper two-thirds, or half of the mountain, and forming that kind of valley, which has been denominated "Coorie"† In the neighbourhood of Bunnassur, there are many fine illustrations. Another very remarkable appearance is presented by the valleys first pointed out by Bourquet, as occurring among the valleys of the Alps, viz. *salient* and *re-entrant* angles. In regard to this appearance in the Perynus, Raymond says, which is quite applicable to many of the valleys between Bhar and Simla, "that the angles so perfectly correspond, that if the force which separated them were to act in a contrary direction, and bring their sides together again, they would unite so exactly that even the fissures could not be perceived."

On ascending the mountains towards Simla, and in fact in every direction, an appearance is presented, which strikes much the attention of the traveller on his first visit, we allude to the terraces on the acclivities, bases, and summits of mountains, resembling much the parallel roads of Argyleshire, so ably described by Sir T. Dick Lauder,‡ they however, like the Scotch, are not parallel to each other on the opposite side of the valleys, and moreover they occur every where,

* Physical Geography is at present but in its infancy, the description of the form and grouping of mountains is but imperfectly understood, and much neglected. In books of travels, the vague descriptions given in general, are quite beyond comprehension. In this country scarcely any attention has been paid to the subject, though presenting probably the first field in the world for observation. We shall afterwards inquire into the age of mountain ranges, based upon their parallelism, a supposition first advanced and ably defended by the celebrated Beaumont, when we have examined more of the Himmalehs, which will allow us to compare this mighty range with those on the European, American continents.

† Imagine an oblique truncation, partly hollow in the upper two-thirds, or half of a mountain, and we have the appearance represented.

‡ Sir T. Dick Lauder's explanation being generally so well known, it is useless for us to notice it here. See Trans. of the Royal Soc. Edinburgh.

throughout the mountains. That they have been produced artificially by man, is evident from these two facts, it is also the method adopted in cultivating the mountains at the present day; we never however, (at least very seldom) see cultivation carried to the summit of mountains, which appears generally to have been the case in former times, shewing that husbandry must have been carried to a much greater extent by the former inhabitants of the hills. There is another fact pointed out to us by Mr. G. Clerk, which goes far, if other evidence was wanted, to prove, that the terraces generally were produced by artificial means, viz. that in those places where they are well marked, we never see old trees, and again in those places where there is not a vestige of them, we meet with trees of great dimensions, pointing out that in all probability these tracts were unworthy of cultivation, and that therefore any thing was allowed to grow; in general where the latter occur the acclivity is steep.*

In regard to the different parts of a mountain. The *foot* among the Himmalehs is generally found, owing to the steepness of the *acclivity*, to occupy but a very small proportion; the *acclivity* is always the most extensive part, its angle varying from a few degrees, to the mural. The *summit* in general is very steep, and frequently truncated, if we may be allowed to use the expression. *Soil.* The superincumbent soil, from the nature of the rocks, is in many places very good, presenting a rich vegetation. It is of two kinds, transported and untransported; of the former, we have five examples in the valley ascending from Pinjore to Bunnassur, being in many places upwards of 150 feet in thickness, and with boulders, many of an enormous size, of rocks quite different from those we meet with in the neighbourhood. In crossing Hurreepore bridge, and ascending towards Subbathoo, there is another fine example. That these are transported soils, is evident, not only from the nature of the boulders which occur, embedded; but also from their form being always rounded, shewing that they must have been brought from some distance, and subjected to considerable attrition. Into the age of these deposits we shall afterward inquire, our examination as yet being of too trivial a nature to allow us to speak definitely. It has been

* Dr. Griffith in his account of the mission to Boutan, states, that he found many of the "lower mountains curiously marked with transverse ridges." These he further adds, "have much of the appearance of ancient terrace cultivation, but on inquiry, was assured that such was not their origin." He does not give any explanation as to the manner in which they were produced; probably, however, they may have been found in the same manner as the Scotch parallel roads. For Dr. G's. remarks, see Journal of the Asiatic Society, New Series.

stated to us, that in the first locality, bones of fossil animals have been found, either imbedded, or in the neighbourhood. If the first statement should turn out to be correct, of which however he is doubtful, it may probably be the means of allowing us to draw conclusions in regard to the age of these deposits generally throughout the Himmalehs. To these transported soils we therefore beg to direct the attention of observers; of the latter, or untransported soil, we have of course abundance of examples. In many places it is of great thickness, as has been shewn by some sections lately made at Simla on the road from Subbathoo to the village of Draw, it also occurs in many places, of great thickness. This kind of soil is formed by the decomposition of the subjacent rock, or rocks and vegetable matter, and contains in general imbedded angular fragments of the rocks which occur in the neighbourhood. In regard to boulders, it may be stated, that there are two kinds, which may be denominated *natural* and *artificial*, the former produced by decomposition, the latter by attrition. To account for boulders in many cases on the summit of mountains, many erroneous statements have been made, and absurd theories proposed, which would have been avoided if the author had paid attention to this, and examined the mineralogical characters of the boulders, and of the rocks in situ; for instead of finding that the boulders had been brought from a distance, it would have been discovered, that they were in their original position. In trap and granitic districts, these natural boulders are frequently met with; in the former, caused by the oxydation of the iron, which enters more or less into the composition of all traps, and frequently in its least oxydized state, and thus tends to combine with more oxygen; in the latter, by the decomposition of the alkali of the felspar (generally potassa) a substance frequently found in the felspar of granites;* the earth which remains is the celebrated Porcelain earth. To find trap on the ground scale exhibiting the columnar structure, and each of the columns composed of a series of balls, is not unfrequent. It is in these districts we meet with so frequently natural boulders of trap; if we examine minutely into the structure, we shall find that the concretions are

* Analysis of rocks is a subject, which has as yet engaged but little attention; we are glad to see that one chemist in this country (Professor O'Shaughnessy) is paying some attention to the subject; it will amply repay his trouble, opening up a wide field of discovery, and at the same time giving to geologists the means of validating or refuting many of the theories, in regard to the formation of rocks which have been advanced. We hope therefore the Professor, who in his splendid laboratory has every thing at his command, will take the opportunity of conducting operations upon a more extensive scale, and at the same time give quantitive analysis.

arranged in concentric caurellæ, and as these are decomposed from the cause already mentioned, the natural boulders are found. To find artificial boulders at great heights among the Himmalehs, is not uncommon; there distribution, and how caused, we shall afterwards inquire. Vegetation in its distribution among the mountains presents very extraordinary characters—thus that of the south side of a hill is quite different from that of the north; moreover the grouping of trees in the two aspects is quite different. On the northern they become much sooner shrubby, and disappear, than they do on the southern. This is amply proved by the observations of Mr. Gerard, for a copy of which we are indebted to Dr. Macleod.

Springs.—In regard to the temperature of springs, all those we met with were of the same temperature (or a little lower) than the surrounding air. Having made these few preliminary observations, which will prevent much repetition in the series of memoirs about to be offered, and of which this may be considered the first, in order to elucidate the geology of the Himmalehs, we shall now direct our attention more particularly to the subject. The rocks met with between Bhar and Simla, belonging to two grand divisions, viz. the *secondary* and *transition classes*, the latter, transition, may be subdivided into the older and newer, or the transition properly so called, and the *Silurian formation* of Murchison, a term lately given by this distinguished author to a series of slates, sandstones, and limestones, lying between the old red sandstone and grey wacke series, or, in other words, a mere extension of the latter, according to the views of Professor Jameson. To Mr. Murchison however much credit is due, for the able and luminous manner in which he has elucidated these rocks. By him they were first discovered in South Wales. In Scotland this so-called formation had been long known, though not considered entitled to another denomination; they have also been discovered in various parts of the European continent. In Asia Minor, Mr. H. Strickland stated to us, that he had found a large series of rocks as their equivalents. In India they have never as yet been noticed, although they seem to occur in vast abundance among the Himmalehs, at the same time, exhibiting characters similar to those met with in Wales, judging from hard specimens.* Their extent we have not as yet been able to ascertain; it must how-

* The specimens we allude to were in the possession of our friend R. J. Hay Cunningham, who brought them from particular localities in Wales mentioned by Mr. Murchison. In the Museum of the Royal Society Edinburgh there is a collection presented by the discoverer; but so uncharacteristic, as to be quite unfit for reference.

ever be great, judging from the abundance with which they occur between Bhar and Simla. In Sect. I, which points out the formations generally, we have made no mention of tertiary rocks, not that they do not occur, but want of time, and the state of the weather, has prevented us, as yet, from examining them. From what has been stated by some authors, they seem to occur in great abundance in the Sewalick, or Sub-Himmaleh range, from whence the splendid fossil organic remains lately discovered (which have excited such vast interest in the scientific world), have been obtained; with regard to these deposits, little satisfactory information has, as far as we know, yet been published. The fossil organic remains have received much attention from Falconer, Coulley, Baker, Colvin, and Prinsep, the last of whom, by his zeal, ability, and perseverance, has stirred up a spirit of inquiry, and given a stimulus to science in general, which before his time was unknown; his loss to India at the present moment is truly a national one. By several individuals splendid collections have been transmitted to Europe, among which we may mention those of Colvin and Macleod. In the Palæontology* of this country, still, however, there remains a vast deal to be done.

At Bhar, the secondary rocks we meet with consist of sandstone, slate clay, and trap. As we proceed eastward to Bunnassur we meet with the same rocks, having a dip S. and by E. with an angle varying from 15° to 50°. The trap (green stone) abounds with iron, giving the rocks in many places a reddish brown colour. The same remark applies to the slate clay, which in many places is much decomposed. At the line of junction of the sandstone and slate clay with the trap, they are frequently found to be highly indurated; of this appearance we have many fine examples at Bunnassur. The sandstone, which is in general of a greyish white colour, abounds with mica, giving it in many places a slaty form; this variety is the micaceous sandstone of some authors. In the locality just mentioned, I found a large calamite in the sandstone, and in the slate clay at a short distance from it a fern and seed. The iron which occurs disseminated through the wackes is the red iron ore, or red hematite, in too small quantity however to be of any economical value. In proceeding

* Since the above was written, we have seen the splendid collection of Capt. Baker at Dadoopoor. In it we saw several specimens which could not be referred to any of the animals already described, no doubt quite new species; one, of which however there was only a fragment, seemed to belong to a genus hitherto unnoticed, approaching in several characters to one of the genera established by Cuvier, probably forming one of the connecting links.

from Bhar towards the Fir-tree Bungalow, we meet with much trap (greenstone) breaking through in every direction, and altering the Neptunian secondary strata, rendering their examination rather intricate. In proceeding from Subathoo to the eastward, towards the village of Draw, we have a fine example of the coal formation presented; opposite to this village we meet with limestone dipping to the S.W. under an angle of about 50°. Resting upon it, there is a bed of slate clay, and upon it, another bed of limestone; proceeding towards the westward we meet with sandstone, and resting upon it limestone; succeeding it, slate clay and bituminous shale. At the village of Koli we again meet with limestone, and as we proceed, following the same route, passing the villages of Benti, Rugg, Gegutkun, Shulkiali to Boag, we meet with other ten similar alternations, (see Sec. II). The beds have all the same dip, the angle varying from 25° to 56°. At Draw there is a water-fall, which is precipitated over the limestone cliffs. The whole face of the cliffs here, and along the route just mentioned, having a height varying from about 150 to 200 feet, are more or less covered with calcareous sinter and tuffa, shewing, as these minerals are deposited from water, that water-falls must at one time have been general in this district. Resting upon the limestone at Draw, and in one or two other localities, we meet with an extraordinary alluvial conglomerate, composed of small angular fragments of limestone, slate clay, bituminous shale and sandstone, held together by calcareous matter deposited from the water; whether the calcareous matter is deposited by springs issuing from the limestone rock, we are unable to state, our examination being of such a cursory nature; it is however more than probable. To account for goitre, various theories have been proposed, and the one, viz., that it is owing to mineral matter (lime) contained in the water of which the inhabitants drink, has been adopted, and strongly advocated by many medical men in this country. According to this theory it ought to be very prevalent in this neighbourhood. That this explanation will account for the disease in many localities, is no doubt probable; but how are we to explain its occurrence, and that too, to a great extent in primitive districts, where the only rocks met with are gneiss, mica, slate, clay slate, and granite, and in all the springs in which no lime has been detected; moreover, in many districts in Britain and on the continent of Europe, composed entirely of limestone, and in whose springs lime abounds, goitre is unknown. We shall afterwards enter fully upon the subject, when we have examined among the Himmaleh districts, similar to the above, of which there are no doubt many. In

the meantime we beg to draw attention to the villages occurring between Boag and Draw, in order that it may be proved whether goitre is prevalent or not. In its characters, the limestone varies from compact to earthy, the latter caused by the action of the weather; its colour varies from greyish white to bluish black, and in many places we find large embedded masses of *stinkstone*, of a dark greyish brown colour, or rather we ought to say, that the limestone during its deposition, has, by the evolution of sulphurated hydrogen, been converted into this mineral; when broken, the fœted odour is strongly perceptible. For architectural purposes, and as a top dressing when burnt, to soils containing the salt of iron, or any acid matter, this limestone is admirably adapted. In this manner many of the soils in India might be much improved. In structure, the slate clay and bituminous shale vary much; in some places indurated, in others partly decomposed. Their colour also varies much; of the former the most prevalent colour is greyish black, of the latter, brownish black; sometimes the slate clay, owing to the abundance of iron, is of a reddish brown colour. At the village of Boriti the slate clay has an angle of 70°, and is much contorted; near to this there is a thin bed of slate embedded in the sandstone. In regard to the rocks of the coal formation here, and those of other localities already mentioned, we may state (as we have already done generally) that they present the same mineralogical characters as those rocks, occupying a similar position in Europe. The true position of the coal measures, which has frequently been given erroneously by authors in this country, is when the geological series is complete between the red conglomerate and mountain or carboniferous limestone; the former the Rothibugende* of the Germans is frequently wanting; when this occurs, we have the magnesian limestone superimposed upon the coal measures. In a work lately published on Indian Geology, it has been stated, that the magnesian limestone occurs, alternating with the coal strata. As such a statement is very apt to lead to a serious error, we have been induced to notice it. The rocks which the author has found, are merely the limestone of the coal formation, impregnated with magnesia; and it is a fact, proved by a vast series of experiments, that when the coal or any other limestone comes in contact with trap, it generally receives a large dose of mag-

* In England it is sometimes termed the Exeter red conglomerate. In Scotland it has never been met with.

nesia, sometimes as much as 35 or 40 per cent.* Moreover in a practical point of view, it is of the greatest consequence to distinguish these two rocks, as coal never occurs associated with the magnesian limestone, properly so called. In the same work the author talks about the discovery of shell limestone in the coal formation; no doubt he discovered limestone with shells, which frequently abound in the coal limestone; the other term however is strictly applied to a rock which is much newer and of rare occurrence, which has not as yet been met with in England. Murchison, however, has stated, that he has found its equivalent on the European continent; it occupies a position between the red marl, and the new red sandstone. It is the Muchelkalk of the Germans. To distinguish therefore between these, and at the same time to apply their proper names, is of consequence, which can be easily done by examining the fossil proper to each; characteristic of the latter, we have Encrinilis, Monitiformis, *Avicula*, *Socialis*, and *Ammonites*, *Nodasus*, &c., and of the former Producta Serebralulæ, or the Ceratitis, &c.

There is another circumstance worthy of notice here, viz. *Red Sandstone*. It is not to be supposed that when sandstone is of a red colour, it must always belong either to the old or the new red sandstone, an erroneous idea which has led to many errors, and much censure by foreign geologists. To find red sandstone alternating with the white sandstone of the coal measures (a fact which ought to be recollected by individuals engaged in searching for coal in this country,) in Europe, is not unfrequent. In lower Silisia nearly the whole of the coal field is composed of reddish brown, and cochineal coloured sandstone, with which great beds of coal alternate.† In Scotland, in the Lothians, alternations of the red and white sandstone in the coal fields are frequently met with.‡ This rock (red sandstone) seems to occur in great abundance in this country; its relations, however, have not been properly investigated. In a report drawn up for the Coal Committee by Dr. M'Clelland, there is much interesting information in regard to it; of the rocks which enter into the composition of the coal formation, we have already mentioned as occurring among the Himmalehs sandstone, slate clay, bituminous shale, and limestone. To make the series complete, we want, fine

* Edinburgh New Phil. Journal. Analysis of Limestone from the neighbourhood of Trap ——— Dumifrieshre, by William Copland, Esq. In the same Journal many similar analyses will be found.

† Notes to the Geology of Dumfrieshire, by Professor Jameson.

‡ Ibid. Locis Citatis and Cunningham's Essay on the Geol. of the ——— Trans. vol. VII.

clay, clay ironstone, and coal, which consists of four kinds—pitch coal, slate coal, canal coal, and glance coal; the last however in the secondary series occurs in but small quantity, and is of no value. Resting immediately below the carboniferous or mountain limestone, we find among the Himmalehs a series of slates (the old red sandstone where we have as yet examined being wanting) the equivalent of Murchison's Silurian system, between which however there is no line of demarcation from the transition properly so called, viz. the grey wacke, grey wacke slate, clay slate, &c. having the same angle, dip, and direction. Shortly after leaving the Fir-tree Bungalow, we meet with the slates in general dipping to the N. E., under an angle of upwards of 70°. At Hurreepoor Bungalow we still meet with the same slates, alternating with quartz rock, and as we approach near to Syree, we meet with a series of alternations of grey wacke, grey wacke slate, clay slate, sandstone, and quartz rock. Syree village is built upon clay slate; on ascending the hill which overlooks Syree, we find the slate occurring nearly at right angles, with the usual dip to the N. E., produced by a large mass of quartz rock. In no part of the mountains which have as yet come under our observation, are the effects of the quartz rock on the grand scale more beautifully seen, than in this locality, nor could a finer example in order to study the effects, and at the same time the relations of the latter, be pointed out. On the south side of the village of Calug, which consists of a few native huts, the slate is highly inclined, and much contorted, and dips to the N. under an angle of 75°. Before reaching the village of Badari, which consists of a small bazar, and about twenty or thirty native houses, we again meet with the quartz rock, stratified, and dipping to the N.W. under an angle of 25°. Immediately above the village mentioned, close to which a mountain torrent passes, we have a beautiful section of clay slate, upwards of two hundred feet, being exposed dipping to the N. and W. under an angle of 25°.

At the first resting place used by coolies coming from Simla, a small table-shaped hill, distant about two miles from it, there is an immense dyke of basaltic greenstone, cutting through the clay slate, which at the line of junction, and for some distance, is much indurated. Cutting through the basaltic greenstone we have small dykes of syenitic greenstone, we have therefore here three different ages of formation. From this place to Simla we meet with the same clay slate, in many places however highly crystalline and passing into mica slate. The numerous metamorphisms which the slate assumes around Simla, passing from the rather earthy looking slate

of the transition series, into the highly crystalline slate, which is composed almost entirely of mica, or into chlorite slate, mica slate, &c. renders, if the individual observations are confined to this place alone, the determination of the age of the strata in general, impossible. In fact, the whole of the rocks in the neighbourhood of Simla appear to be more or less altered, but all belonging to one grand group, viz. the transition. To make out this point, we must proceed northward from Simla towards Kotgur, where ample means will be found to settle it. The changes observed are quite similar to those exhibited by the grey wacke in the south of Scotland, when in contact with Plutonian rocks.* In examining the neighbourhood of Simla, we were much assisted by Dr. Macleod, who being intimately acquainted with all the finest, most interesting, and best exposed sections, at once directed our attention to them, by means of which we were in a comparatively short time enabled to acquire a thorough knowledge of the district. To him we beg here to acknowledge our great obligations, and to return our grateful thanks.

The rocks met with in the neighbourhood of Simla, are,

1 Grey wacke,
2 Grey wacke slate,
3 Clay slate,
4 Chlorite slate,
5 Mica slate,
6 Quartz rock,
7 Syenite,

on both sides of Simla valley, whose direction proceeding downwards is at first nearly due east and west, it then takes a turn to the south west; there is clay slate; on its east and by north side we have the Jacko mountain, reaching to a height of 8,300 feet above the level of the sea. It is entirely composed of clay slate, in many places as near; and at the summit, we meet with large embedded dykes of quartz rock.† The ridge upon which the Simla bazar

* Journ. on the Geology of the Criffel Kirkbran and the Needle's Eye in Galloway. Wern. Tran. vol. IV. Dr. Grierson on the mica of Galloway. Ibid, vol. II. and Hay Cunningham, locis citatis.

† The Jacko is the highest mountain met with in the neighbourhood of Simla, it is considered to be about 800 feet above the Simla bazar. By experiments made conjointly with Dr. Macleod, with thermometers and boiling water, we ascertained that his house, situated at the foot of Jacko, was 7,800. By similar experiments we ascertained the height of Subathoo 4,480 (Mr. G. Clerk's house at Bunnassur 5,600); on all occasions we used rain water if it (or snow water which is the best) is not used, the result given is usually inaccurate, common spring water containing a quantity of foreign ingredients, it ought therefore never; if possible, be had recourse to.

rests is also almost entirely composed of clay slate, dipping to the south east under an angle of 25°. In Section No. III. we have given a view of the strata extending from Dr. Macleod's house, at the foot of Jacko, immediately above the bazar, to Lord Auckland's Road.

The clay slate varies in colour from bluish black to ash grey, with the various intermediate tints. In structure, it varies from rather earthy to highly crystalline, and in its transitions we have it passing, as in Simla valley, into chlorite slate; in other places, as in the Auckland Road, into quartz rock, the latter of which frequently alternates with it, in thin layers, forming mica slate. In composition, as already stated, it frequently consists of nothing but mica. In the section of the Auckland Road, we meet with a large mass of slaty quartz rock, formed by thin layers of clay slate alternating with the quartz rock; in fact it is almost identically the same in mineralogical characters, as the rock met with in the Lockken district in Kirkcudbright, Scotland; from the first time we examined this section we were instantly struck with the identity, which a further examination fully verified, of the induration and alternation of the clay slate in junction with quartz rock; we have a beautiful example at the first water-fall below Simla. Here there are large masses of quartz, forming dykes of many yards in thickness in the clay slate, whose greyish white colour contrast finely with the dark bluish colour of the latter rock. The fall is a perpendicular height of about 140 feet, over which, during the rainy season, a very considerable body of water is precipitated, forming an interesting sight, well worthy of the attention of the traveller; with Dr. Macleod we also visited and examined the other water-fall, some distance below the one mentioned, and found the rocks, &c. to be similar. In tracing the strata in the bed of the river from it towards Simla, we meet with many junctions, and it is here we find the clay slate passing into chlorite slate. The rolled masses, or boulders, principally consist of quartz rock, syenite, clay slate, chlorite slate, &c. In a valley bearing north and by east from Anandale, there is a quarry of clay slate, which is used as a roofing material for many of the houses in Simla, the rouge, huge, thick and unshapely masses employed are quite in unison with the mineralogical operations carried on in other parts of India; in fact it is quite remarkable that the beams are able to support the enormous weight superimposed. We have already stated that no where in the immediate neighbourhood of Simla is grey wacke to be met with; but as we proceed northward towards Kotgur, about one and a half miles, we

meet with a series of alternations of grey wacke, grey wacke slate, and clay slate, having the same dip and direction as the slates just mentioned, proving that they must be of the same age, and that they were up-raised contemporaneously. How far this series extends towards the north we have not as yet ascertained; as far as we have gone, viz. upwards of four miles beyond Simla, we have still found it.* Four miles to the south of Simla we have already noticed a similar series of alternations. In its characters, the *grey wacke* is characteristic, consisting of a basis of clay slate, with imbedded fragments of clay slate, quartz rock, flints, &c. The size of the embedded fragment varies from upwards of six inches, to so small as to be almost imperceptible to the naked eye, and forming gradually a transition from the grey wacke to the grey wacke slate, and from it into clay slate, in which no fragments exist. In No. V. we have given a section exhibiting the different alternations from the most northern point to which we have as yet gone to Simla. It is rather remarkable, that here, where we find the grey wacke unaltered, quartz rock occurs in but small quantity. The clay slate which alternates with the two rocks mentioned, is identical in its mineralogical characters with the clay slate of Simla, when not in junction with quartz rock.

Quartz rocks occur in three different forms; as imbedded masses in the slate, as dykes or veins, and in masses exhibiting the regular stratified form; the seams of stratification being as well marked as either those of clay slate, or grey wacke slate. In structure it is compact or granular, much more frequently the former. The colour is generally greyish white; sometimes, owing to the presence of iron, it is reddish brown, blood or brick red; in a few instances we have observed it of a rose red colour, void, however, of the fine translucency observed

* Since the above was written we have in company with Dr. Macleod examined the country as far as Tagoo; the predominant rock is still the clay slate; near to Mabassoo we meet with two alternations of quartz rocks. In this route the clay slate is frequently formed contorted in a most extraordinary manner. The dip is generally north and west, the angle varying, in some places it was about 70°. The magnificence and grandeur of the view of the snowy range from Mabassoo can be better imagined than described, and the optical delusion is so great, as to make it appear not more than six or seven miles distant. In the foreground you have here and there thick wooded districts, whose dark shade contrasts beautifully with the bleak white, but majestic peaks, whose snow-clad summits tower into the heavens, and defy all human exertion to surmount. Here also you see well what we have already stated, though with some doubt, viz. the *parallelism of the subordinate mountain ranges and valleys.*

in the rose quartz* met with in Bavaria, Saxony, &c. That the quartz rock owes its formation in many places to Plutonian action, is fully proved by the observations already made, and by many other sections not yet noticed. Probably the best to illustrate this, is to be met with on the road leading from the small church of Simla down to the river torrent. Here we have a large dyke of quartz rock, cutting through the slate, and altering it; superimposed there is a large mass of slate lying upon the outcrop of the dyke, unconformable to the other slate, and at the same time converted into a highly crystalline mass, which seems to have been torn off from the subjacent rock at the time when the quartz rock came from below (see section VI.); moreover to meet with large masses of slate imbedded in the quartz rock, is not an uncommon occurrence. In the Simla road, immediately above the cantonments of the Goorka battalion, there is a good example. The alteration, shifts, &c., met with in the clay slate when near the quartz rock (see section VII.), is also another proof of the existence of Plutonian action, and moreover we find it passing imperceptibly in the new road, or Auckland Road, into syenite. Here also imbedded in the quartz rock, we frequently meet with veins of quartz of a much whiter colour, pointing out in a striking manner the shifts which have taken place (see section VIII.) That however in other places it is Neptunian deposition, is evident from its regularly stratified form, and at the same time when in contact, not altering the clay slate.

The last rock we have to notice is *Syenite*. It occurs in only one locality, in the form of a large amorphous dyke, intersecting and altering the clay slate, it passes gradually into quartz rock. In structure it is small, granular, and is composed of quartz and hornblende, the former of a greyish white, the latter of a leek green colour. As we have not examined sufficiently minute the traps† mentioned, we shall take another opportunity of giving an account of them.

* The rose quartz of mineralogists, owes its colour to manganese, and is much prized, when pure, as a precious stone; it is however very liable to fade, if much exposed to the air. Jam. Manus, Sect.

† At Rajmahul, where it is stated existed the capital of the Mahomedan power in Bengal, in the reign of Akbar, towards the end of the sixteenth century, we find among the ruins some fine examples exhibiting the polish, which some of the trap are capable of receiving. Thus, in the *Sungi Dullau*, or marble hall, erroneously so called, there are still existing some enormous slates of beautifully polished basaltic clinkstone, ornamenting the doorways, walls, &c. which by the ignorant have been considered black marble, and thus given rise to the erroneous name. In every work we have consulted, this term is used. It is also stated that the ruins principally consist of granite, a word too frequently used as a cloak for ignorance. What we principally saw were bricks and trap.

In regard to simple minerals met with imbedded in the rocks, our list is but small, consisting of

Calcereous Spar,
——— Sinter,
——— Tuffa,
——— Quartz,
Dodecahudial Garnet.
Red and brown Hematite.

In addition to the localities mentioned of the iron ores, Dr. Macleod pointed out to us several masses in the bed of the river torrent in Simla valley, shewing probably, as the fragments were angular, that a vein, or veins, occur near, of little value, however, from their impurity. In regard to the garnets, it is rather a remarkable fact that we have only met with them in those localities where the clay slate appears to have been much altered; the same has been remarked in Europe by Sedgwick, and Lyell. As yet we have no account of the minerals met with among the Himmalehs; those already noticed amount to not more than twenty or thirty, a statement truly remarkable, pointing out how lamentably this department has been neglected; in such a mighty range we ought to meet with an immense number of minerals. In the collection of the Asiatic Society of Calcutta, we found several minerals which have never as yet been noticed as occurring in India; but whether these were found in this country, or imported, is a question, no labels being attached, and Mr. J. Prinsep in England. Calcareous spar occurs frequently in the form of veins in the clay slate. Of the other minerals mentioned, the localities have already been given.

Having now noticed, both generally and particularly, all the rocks and minerals which have as yet come under our observation, we shall make a few remarks in regard to that formation (the most important of all formations) which forms such large tracts of the Himmalehs; I allude to the coal formation. From what has been stated by authors, and from what we have already seen, it is not at all improbable that there is a belt composed of those rocks, extending along the whole base of the Himmalehs proper. The furthest point, to the westward of which we have notice of these rocks, is Attock, and to the eastward, probably Darjeling; comprehending about 17° of longitude; that, however, it extends further in both directions, is more than probable. That no bed of coal worth working has

* Near Subathoo imbedded in the slate, sulphate of lime or gypsum is found. From this rock the celebrated Plaster of Paris is made.

been met with in such a vast tract of country, results not from its absence, but, probably, from the partial manner in which the country has been examined. Captain Herbert in one of the vols. of the Asiatic Society's Trans. has given a paper on the occurrence of coal in the Indo-Gangetic mountains, in which he comes to the conclusion, that all the sandstones and other rocks noticed, belong to the red wacke series, but from data utterly groundless; and remarks in regard to the probability of finding the coal formation, that the indications are unfavourable; we shall however quote his own words—"it will be perhaps asked," he says, "is this coal, of which the traces are probably widely diffused in our sandstone range, likely to prove of any value, or do these many indications afford any ground to hope for the discovery of more extensive and profitable deposits?" To this it may be replied, that the considerations upon which are founded the hope of discovering, in the neighbourhood of these mountains, the true coal formations, are quite independent of its occurrence under this type and in this form; if any thing perhaps, they are rather unfavourable to the expectation of eventually discovering beds of the true coal formation, for it has been noticed, that in those countries in which the coal beds are most largely developed, as in England, the traces of the mineral in the superincumbent sandstone are rare, if not altogether wanting; while on the continent, where the true coal beds do not occur, small seams or veins are frequently met with in this rock. To find traces of coal in superincumbent sandstone, in districts where coal has not been found, is one of the strongest evidences, if not the most important, that coal is present. In fact nothing is more common in a coal district, than to see disseminated through the sandstone, or occurring in small seams, coal prior to reaching an important bed; we may state that from it we are entitled to infer, that if a shaft is sunk sooner or later, we shall arrive at the bed of coal. In examining a coal district, advantage should be taken of all the streams that occur in a district, for by so doing, a transverse section of the strata is obtained, and frequently thus the outcrop of a bed of coal is perceived. It is also of importance to examine the masses which occur in the stream, coal in such localities, frequently occurring at a considerable distance from the bed in situ. If the remarks of Captain Herbert were applicable, all the observations made by geologists, mining engineers, &c., would be void. In the same paper we are told, that grey wacke is considered as synonymous with the old red sandstone by most geologists; who these geologists are he alludes to, we do not know. Also that at Delhi

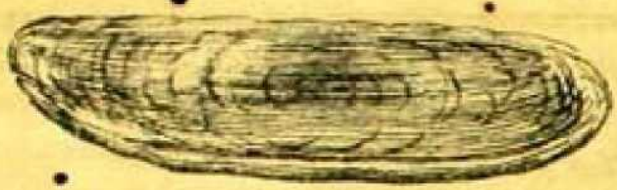
and other places there is a primary sandstone; we take notice of these statements, in order to shew that Captain Herbert made the above statements prematurely. It is impossible for any individual at all acquainted with the mineralogical characters of rocks, and the relative position which they occupy in the crust of the earth, to attempt to prove that in one continent rocks with identically the same characters and fossils, are different from those in another. To find slate clay, bituminous shale, limestone, and sandstone, as the equivalent of the red marl, upon the evidences he has given, is more than premature, originating however, in all probability, from the description of the rocks in the Punjaub, which (probably without a proper examination) have been considered as the continuation of those to the eastward. It has been stated no doubt that no bituminous shale occurs, but we have shewn that it, as well as limestone, occurs in great abundance, the former of which rendering the probability of the existence of coal in quantity, more probable. That the equivalent of the red marl may be found, and that too in some of the districts mentioned by Herbert, is possible; and if such should turn out to be the case, it is well worthy of examination, seeing that it is in this formation, the great beds of rock, salt, and gypsum, or sulphate of lime are found.

To discover coal in quantity in the neighbourhood of the Sutledge, or any place where there is easy access of carriage in that direction, would no doubt, in a short time, be of incalculable benefit to the country at large. In a short time the Indus will become an immense resort for trade, and we may expect it soon to be covered by all kinds of vessels; but those to which the European looks forward, whose power and rapidity of motion have so approximated Europe, will ever take the lead; and until stream vessels are impelled by some other moving power, coal will ever be considered as one of the greatest benefits conferred on mankind; moreover in connexion with the coal we may expect to find clay iron-stone, which will also prove of the utmost consequence. It is from this ore that three-fourths of the iron is obtained in England. It has been met with at Darjeling, and several other places in India, but from the want of fuel and flax to reduce it, we do not think it has ever been made use of. If however we look at the mineral resources of this country, what are they at the present moment? nothing to what they ought; a spirit of inquiry is now happily gaining ground; sanctioned by Government a coal committee has been appointed. To its proceedings therefore we look forward

Wooden Tray

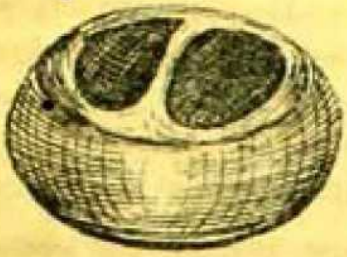
from 2 feet to 8 inches long

1/2 inch thick



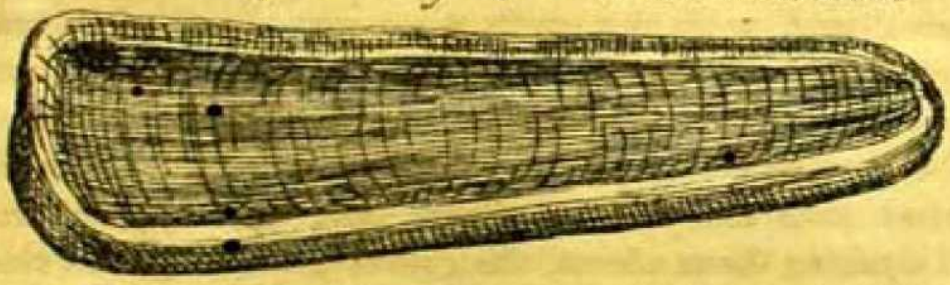
Wooden Bucket

7 or 8 inches diam.



Wooden Trough

3 or 4 feet long 1 foot or 18 inches wide





with interest, and hope soon to see through its exertions, a spirit of inquiry stirred up throughout India.

(*Signed,*) W. JAMESON.

AMBALLA,
13*th October*, 1839.

ART. V.—*Note on the process of washing for the Gold Dust and Diamonds at Heera Khoond. By* Major J. R. OUSELEY.

The day before yesterday, I visited the Heera Khoond, and saw the process of washing for gold dust and diamonds. A set of fishermen have villages free from rent; on this service, men, women, and children are employed. The women alone wash, the men and children bring the gravel and sand in wooden trays, and place it in the trough, which is open at one end, with a gentle inclination towards the river, on the edge of which the women sit. With their left hands they stir up the gravel, and with the right pour water out of a wooden basket-looking bucket gently over the upper end; it runs out into the river, the larger pebbles and gravel are thrown over, and the finer sand, on the trough being full, re-washed until little remains, when it is removed into the wooden trays, and by dipping them under water, and shaking them about, the gravel gradually falls over, leaving only gold dust. They detect the diamonds at a glance, as they wash. One I saw about the size of a large grain of wheat, clear and bright; but these are not to be purchased, as they are the Raja's property. The gold they are allowed to dispose of; which they do at 12 or 15 rupees per tola. The veins are, I am convinced, some distance off, as the grains of gold appear flattened by collision, in rolling among pebbles. I have the pleasure to send 3 mashas, ($\frac{1}{2}$ a tola not yet brought), and some of the rocks about the spot where the diamonds and gold dust are found. The *Heera Khoond* is an island, about a coss long, and one or two hundred yards wide in the Mahanuddy, seven miles, seven and a half furlongs from the eastern end of Sumbulpoor. The *Heera Khoond*, is that part of the river, which runs south of the islands The diamonds and gold dust are said to be washed down the *Ebee* river, about four miles above the *Heera Khoond;* but as both are procurable as far as Soonpoor, I am inclined to think there may be veins of gold along the Mahanuddy. It would however, I think, be very desirable to have this part of the country properly examined, which it never was yet. Gold washings might be under-

taken on mechanical principles, which would, by reducing the manual labour, make the speculation highly profitable in gold dust alone, setting aside the diamonds.

The season for washing is after the river subsides, on the rains ceasing; but they occasionally continue until the rains again interrupt their labours. I have *fancied* that a graduated wire-sieve washing machine might be made, larger at the top, and smaller as the sieves approach the bottom, which would in the passage of the debris, flung in at the top one, to the bottom (a wooden tray) keep the more minute particles in suspension, or permit of the sieves retaining in succession the pebbles of gravelly matter; all earthy particles being carried away, if the machine were placed in a gentle stream, the gold dust would be found in the tray. Each sieve should be carefully examined for diamonds, on the machine being full; the machine might be six feet long, two wide, and six or eight high. The sieves being a foot or 18 inches apart, it would be necessary only to take up the top and second sieves often, the lower ones would take longer to fill; the machine should be made so as to admit of its being shaken constantly, and hung up in water six or seven feet deep, where the current would be gentle.

J. R. OUSELEY.

Camp, Sumbulpoor,
Feb. 14th, 1840.

P.S.—Their is also gold dust, in the Brahminee river, about six marches east of this, but no diamonds.

The women sit along the edge of the river, facing inwards, and gradually form little mountains of pebbles. The number employed is very great, but the speculation is not very profitable now.

Art. VI.—*Proceedings of the Asiatic Society.*

(Wednesday Evening, the 4th March, 1840.,

The Honorable Sir E. Ryan, President, in the chair.

The Proceedings of the last Meeting were read.

Messrs. James Colquhoun, H. Sweetenham, C. K. Robison, T. C. Cadogan, and R. H. Mathews, proposed at the last Meeting, were balloted for and duly elected Members of the Society.

M. Renaud proposed at the last Meeting, was upon the favourable report of the Committee of Papers elected an honorary Member of the Society.

The Rev. A. W. Street proposed by Dr. O'Shaughnessy, seconded by Mr. Sutherland.

Rajah Kishtna Nath Roy proposed by Mr. Sutherland, seconded by Dr. O'Shaughnessy.

Read letters from Messrs. A. Porteus and W. A. Green, withdrawing themselves from the Society.

Read a letter from Messrs. W. H. Allen and Co. intimating their having forwarded the busts of Sir Wm. Jones and Mr. Colebrooke, per ship "Felicity." (The busts arrived on the 20th April in perfect safety.)

Read a letter from James Reynolds, Esq., Secretary to the Oriental Translation Fund of the Royal Asiatic Society, stating that arrears of the Society's subscriptions were due to the amount of 42*l.*, from 1836 to 1839 inclusive.

The Secretary informed the Meeting that the Society's Book Agents in London have been instructed to discharge the claim in question.

Library.

The following books were presented:—

The East Indian Journal of Literature, Science, and the Fine Arts, No. 1, by R. C. Woods, Esq. L.L.D.——*by the Author.*

Esquisse Generale de l' Afrique by Mr. M. D' Avergac,——*by the Author.* through R. C. Woods, Esq., L.L.D.

Proceedings of the Bombay Geographical Society, May, 1839,——*by the Society.*

Proceedings of the Astronomical Society, vol. 4, No. 24,——*by the Society.*

English and Chinese Vocabulary, by R. Morrison, D.D.——*by Messrs. Thacker & Co.*

A brief account of the Chronometer, with remarks on those furnished by Parkinson and Frodsham to the expeditions of Capts. Ross, Parry, Sabine, King, Lyon, Foster, and other distinguished navigators——*by Mr. Frodsham.*

Madras Journal, Nos. 21, 22, 23 and 24——*by the Madras Library and Auxiliary Royal Asiatic Society.*

The following was received from the Booksellers:—

Lardner's Cabinet Cyclopædia, Biography, Literary and Scientific men, vol. 2.

Literary and Physical.

Major J. R. Ouseley forwarded a short notice of the process of washing for the gold dust and diamonds at Heera Khoond, with specimens of the gold dust.

Read a letter from Capt. T. S. Burt, forwarding copy of a facsimile taken by him at Paijore.

Read a letter from Major T. Jervis, (Engineers) forwarding a paper on the cotton at Gujerat, by Mr. Vaupell.

Read a letter from R. C. Woods, Esq. forwarding a paper on the Introduction to the study of the science of Ethnology, or the Natural History of the human race.

Read a letter from Dr. N. Wallich, forwarding for presentation on behalf of Mr. Parker a specimen of the timber of the "Royal George," blown up in Colonel Pasley's operations.

Various specimens of minerals were presented by Major J. R. Ouseley.

A sword fish and a hammer-headed shark, were presented by E. D. Fabian, Esq.

An alligator, presented by Mr. R. S. Homfray.

Museum.

Pursuant to the resolutions of the last Meeting, the Secretary then laid before the Meeting the rules framed by the Committee of Papers, regarding the office of Curator of the Museum.

At a Meeting of the Asiatic Society of Bengal, held on the 5th February, 1840, it was proposed by Sir E. Ryan, seconded by H. T. Prinsep, Esq. and unanimously agreed,

That the office of Curator to the Society's Museum be held in future on the following conditions—1st. Two hours at least to be devoted daily to the duties of the Museum. 2nd. Monthly reports to be made to the Committee of Papers. 3rd. The objects of Natural History belonging to the Society's collection not to be removed from the Museum. It was further decided, that the Committee of Papers should report to the next Meeting, on the nature and extent of the duties the Curator is to undertake, with reference to the office as held in other Museums.

Report of the Committee of Papers.

The Museum of the Asiatic Society of Bengal may be considered to embrace two very distinct departments: 1st. That of Oriental Antiquities, Literature, Architecture, and Numismatics. 2nd. That of Natural History.

It would be of great importance to secure, were it possible, the services of a Curator conversant with both these divisions; but such a combination of acquirements is so rare, that the Society must trust the arrangement, elucidation, and preservation of the articles appertaining to the first division, to the honorary services of the Oriental Secretary, the Librarian, and Pundits.

In the department of Natural History, it must be borne in mind, that the Curator's great object should be, to arrange and extend the Society's collections so as to make these available for the information of the student, conducive to the general illustration and advancement of science, and worthy of the place the Society holds among learned institutions. Viewed in this light, it is of far more importance to the Society that their Curator should assiduously apply himself to the collection, naming, and arrangement, of procurable specimens of the animal and mineral kingdoms, than that he should specially devote himself to the minute elucidation of any sub-division of these subjects.

By the elaborate investigation of a group or family, he may doubtless distinguish himself, and gain high individual reputation, but his utility to the Society would be far greater, by his applying himself to the humbler duties we have specified; moreover, it appears to us that these duties are in themselves more than sufficient to occupy the Curator's time, were it even to be entirely devoted to their discharge.

Our collection of minerals is an utter chaos, though rich in anonymous specimens, —valuable in themselves as illustrations of abstract mineralogy, but devoid of interest in a geological or geographical light, owing to the neglect with which they have been treated by some preceding Curators. It appears to the Committee of Papers, that the first object of the Society, in remodelling its Museum, should be, to form a grand collection of minerals and fossils, illustrative of the geology, geography, and palæontology of our British Indian possessions.

A few of the existing minerals, and some superb fossils in our Museum are available for this object, but it is clearly within the scope of the Society's influence to procure, within a few months, collections of specimens from every part of India, and in such numbers as would find the Curator in ample employment. While waiting for these additions to our collections, he should proceed to name and label those already in our possession. There is no need for delay for the preparation of cabinets. The specimens should be named, labelled, wrapped in paper with a number affixed, and then packed in boxes, until the cabinets are ready.

Duplicates of all specimens should be preserved for verification and analysis. Triplicates should be retained, wherever practicable, for presentation to other Museums in exchange.

The monthly reports should be a statement of progress in this duty, and affording a catalogue of the minerals adjusted. The specimens themselves should be exhibited at each Meeting.

This duty the Committee think should supersede all others for the first few months of the Curator's employment, meanwhile his subordinates would conduct the arrangement of such specimens of the animal kingdom, as might require immediate attention.

All correspondence connected with the Museum should pass through the Secretary's Office, in conformity with the practice of similar institutions. It seems to the Committee of Papers an anomalous and inexpedient practice to commit the whole management of exchanges and similar transactions to the Curator. The suggestions of that officer will be always received with due attention and respect by the Committee; but it is manifest that without their being referred to it, the Committee cannot be responsible for the expenditure which the Curator's measures and correspondence may entail, for the views on which he may act in the management of the Museum, nor for the light in which this department of the Society's labours may be regarded by scientific men, and institutions in other countries.

It seems necessary too, to stipulate that all memoirs or papers drawn up by the Curator for publication, as well as plates, models, &c., on subjects he may have investigated *in discharge of his duties*, should be in the first instance placed at the disposal of the Committee of Papers, also that all proofs of such papers pass through the inspection of the same body.

The Committee are led to this suggestion by the circumstance of a fly-leaf having been prefixed, without their sanction or knowledge, to the last volume of the Transactions. Although containing nothing from which the Committee would dissent, the

precedent is one which they are desirous of avoiding, as it obviously may lead to many objectionable results.

The Committee deem it highly desirable to secure, if possible, Dr. M'Clelland's valuable services on the terms they have now set forth. His acquirements in various departments of Natural History, his zeal for the promotion of science, the liberality and disinterestedness he has evinced in his past connexion with the Museum, entitle him to be preferred to most competitors for this appointment. The Committee have endeavoured in this report however to discuss without bias towards any individual, the stipulations for tenure of office, which they deem most conducive to the interests of the Society and of science, and most likely to receive the approbation of the Government, through whose liberal grant the occasion of this discussion has arisen.

In the event, however, of Dr. M'Clelland's declining to accept the situation on the terms now proposed, the Committee recommend that candidates be invited to present themselves, that the testimonials of such candidates be examined and reported on by the Committee of Papers, and finally considered at a General Meeting. That the individual selected be appointed, but for twelve months, and his permanent appointment be made dependent on the ability and industry evinced during the probationary period.

Should no candidate of sufficient acquirements present himself within three months, the Committee recommend that the President be requested to communicate with the proper scientific authorities in Europe, authorizing the appointment and dispatch to India of a competent individual, bound to serve the Society for a period of five years, and subject to the rules herein expressed.

The Committee would not be disposed to extend to any other individual but Dr. M'Clelland, the privilege of devoting but two hours daily to the Museum, and would require four hours at least, actual attendance at the Museum, from whatever other candidate might be selected.

EDWARD RYAN, *Kt. Chief Justice of Bengal, & President of the Society.*

H. T. PRINSEP, *Member of Supreme Council, and Vice President.*

W. P. GRANT, *Civil Service.*

H. TORENS, *Civil Service.*

J. C. C. SUTHERLAND,
W. B. O'SHAUGHNESSY, } *Acting Secretaries, &c.*

D. McLEOD, *Colonel of Engineers, and Vice-President.*

D. STEWART, *Superintendent General of Vaccine.*

DAVID HARE, *Commissioner of Court of Requests.*

H. W. SETON, *Kt. Puisne Judge, &c.*

W. H. FORBES, *Major of Engineers, and Mint Master.*

N. WALLICH, M.D. *Superintendent of H. C. Botanic Garden.*

Minute by Dr. GRANT, *Apothecary to the Honorable Company.*

I regret that I cannot concur in the whole of this report. Agreeing with much of the general principle that pervades it, I dissent from its application to our peculiar circumstances. The report closes with a well merited expression of the desirableness of securing, if possible, the services of a zealous, able, industrious and disinterested naturalist upon the spot, and yet purposes to fetter him with rules, which I fear might damp his ardour and circumscribe his usefulness, without any commensurate benefit to the institution, or perhaps alienate him altogether from a situation which he is well qualified to adorn.

The report proposes the consideration of the subject entirely on abstract principles, without reference to individual fitness here, or convenience of availing ourselves of such at once; but sincerely believing, as I do, that the readiest practicable plan is to avail ourselves of the intellectual means at hand, rather than incur the delay of waiting for remote and uncertain materials, I am averse to the adoption of rules which I fear may deprive us of Dr. M'CLELLAND's services.

The three suggestions contained in the opening paragraph of the report appear to me objectionable, for the reasons to be stated as I proceed. 1st. I would not tie down Dr. M'CLELLAND (supposing him ready to undertake the office of Curator) to two hours daily *in* the Museum. Though it is not unlikely that at an average Dr. M'CLELLAND would devote so much time to the duties of the Museum,—yet I conceive that the precise locality of duties bearing in the Museum, is of less importance than their being essentially well produced and looked after, not merely *in* the Museum, but out of it; since Dr. M'CLELLAND might labour very usefully for the Museum in his own house, without a scrupulous and inconvenient measuring of time within the walls of the Museum; and if left to himself might occasionally extend to more even than two hours. 2nd. Monthly reports for some time to come would almost entirely be confined to mechanical arrangement. Quarterly or half yearly reports, I conceive, would answer every useful purpose, and give less trouble. Let the Committee of Papers be a Committee of Management, and by frequent visits to the Museum obviate any tendency to inaction on the part of the Curator. 3rd. The non-removal under any circumstances of articles from the Museum, would impose a tantalizing restriction. A Museum, especially in India, is not the most favourable place for making minute observations, or recording results and circumstances. There may be several articles that the Curator would like occasionally to carry home, to examine quietly in the privacy of his own study; and I should be sorry to cramp any Curator's convenience by depriving him of this indulgence. To insist upon it, would be like the rule that holds in some libraries, that books should be looked at, only on the premises. That rule may be a very proper one in Europe, but I do not think it at present applicable here. Apply the same rule to numismatology, and it would be found very prejudicial. Had it been strictly acted upon in that branch, I question whether Dr. WILSON and MR. J. PRINSEP (the latter especially) would have effected such splendid results. Neither would I pay our Curator the bad compliment of implying, by such a restriction, that he would not take proper care of specimens. Instead of this, I would permit him to carry away what specimens he required, for a reasonable time; the vacant space being occupied with a card or half sheet of paper, bearing the number and character of the article, and the date at which it was borrowed, with the words, "taken by Curator."

Quite concurring in that part of the report, which states that the Curator's great object should be generalisation of several subjects, and not special devotion to minute observation of a sub-division, yet as I conceive that the two objects are perfectly reconcilable, I have no doubt that Dr. M'CLELLAND would pay due attention to both; neither do I imagine that the claims of speedy and effectual mechanical arrangement would at all suffer in the hands of Dr. M'CLELLAND, or take up so much time, as the proposal to tie down that gentleman's passing two hours daily in the Museum, would seem to indicate. In conclusion, as far preferable to the plan of sending in three months to Europe for a Curator, and procuring one who after his arrival in India would very likely become discontented at finding himself tied down for five years upon a salary which may sound imposing in Europe, but would be only a pittance for a man of education in India, and scarcely upon a par with the pay of some mechanics, I would prefer closing for a twelvemonth with Dr. M'CLELLAND, or with any other qualified gentleman in India, to whom such a limited salary might be an object—should the conditions of offering the situation to the former be such as to make him decline it. *

J. GRANT.

Calcutta, 15th Feb. 1840.

To J. G. C. SUTHERLAND, ESQ. AND DR. O'SHAUGHNESSY,
Officiating Secretaries of the Asiatic Society.

GENTLEMEN,—I was favoured on the 19th with your letter of the 17th inst. inclosing a copy of a report of the Committee of Papers as to the manner in which the duties of the office of Curator to the Asiatic Society's Museum are in future to be conducted, and calling upon me rather prematurely to decide as to whether I can accept the office under such circumstances or not.

It appears to me that before my decision could be of any avail, the rules proposed by the Committee should be passed into law, and authorised by competent authorities. For my own part, I conceive the rules to be altogether vexatious, and so little calculated to promote the interests of the Museum, that I feel assured they will never be sanctioned.

2. In the next place, when the funds of the Society were inadequate to defray the expense of the usual salary, the Museum was just as valuable as it is now, and yet the duties were entirely left to me without restriction; but no sooner was the grant of an adequate allowance made by the liberality of the Government, than all became Curators; and I was supposed to be no longer competent to hold the office except under stipulations quite unheard of, in similar cases.

3. In vain did I even agree to the required stipulations in the sense in which those who proposed them, explained at the last Meeting of the Society that they were intended to apply, for as one scruple was removed, a new one was suggested,* as if either to

* Although I am the only officer of the Society who has but one other office to attend to, yet one of the first obstacles suggested was, that I had not time enough to devote to the duties, and although the officer who suggested this holds four or five appointments and is still a candidate for as many more as he can secure, he has time enough withal to know more of my business than I know myself.† *(Dr. M'Clelland's note.)*

† Dr. M'Clelland forgets that he holds, or did then hold, *three* offices. Namely, Deputy Apothecary; Assistant Opium Examiner; and Secretary to the Coal and Iron Committee—all salaried appointments;—a short time before this discussion he was salaried Curator to the Museum also, to which he had no objection to be re-appointed. The first of the appointments above mentioned requires actual attendance at office from eleven to four daily.—EDS.

drive me out of office, or reduce the situation to a state of dependance quite incompatible with the responsibility attached to it.

It is also to be recollected, that the very first intimation I had of the liberality of the Government, in granting an allowance for the situation I held, was accompanied with a proposition to provide another in my place.

4. As the report proposes to have framed the duties of the office to which such new pecuniary interest is attached, on the established usage of other Museums, I must be permitted to point out the error into which the *Rapporteur* seems to have fallen.

5. The Museum of the Royal College of Surgeons in London is placed under a Board of Curators, over which the Members of the College have no authority. I allude to this Museum as one in which the Government have an interest, and in all other Museums to the support of which the Government contribute, the Curators are equally independent. This Board may not only cut and dissect the specimens in such manner as may be deemed essential, but may send them to lapidaries and others to do the same; and Mr. Clift as well as Mr. Owen may make use of the results, the same as if they had been derived from their own private specimens.

6. The Museum at the India House is placed entirely, I believe, in the hands of its keeper, who may not only make such use of his descriptions of the objects contained in it as he conceives most likely to promote the ends of science, but exhibit those objects when necessary to the Societies of the metropolis.

7. Can the Committee of Papers reconcile this, with the stipulations they require from their Curator? e. g. "that all *memoirs* or *papers** drawn up by the Curator for publication, as well as plates, models, &c. on subjects he may have investigated in the discharge of his duties, should, in the first instance, be placed at the disposal of the Committee of Papers; also, that all proofs of such papers pass through the inspection of the same body." The reason assigned for this very modest stipulation is perfectly ludicrous, and shows how unfit the Committee is to legislate in such matters, namely, that of a "*fly-leaf* having been prefixed without their knowledge or sanction to the last volume of Transactions. Although containing nothing from which the Committee would dissent, the precedent is one they are desirous of avoiding."

8. The Committee of Papers should surely have been aware that it is the Secretary, and not the Curator, who must be held answerable for irregularities of this kind, and yet the odd remedy they would apply is, that of depriving the Curator of the literary property that every one has a right to enjoy in his own free labours. How that could keep "fly leaves" out of the Transactions, I am quite at a loss to know.†

9. As the Committee do not profess to think much of "the elaborate investigation of a group or family," we cannot be surprised that they should not be disposed to encourage such a waste of time; and hence the clause preventing the removal of objects of Natu-

* The only literary work a Curator is expected to perform in the execution of his duty is the preparation of a catalogue of the collection under his charge. Whether that be a *memoir* or a *paper* I must leave to the *legal* learning of those who would draw the distinction. Even with regard to a catalogue, I would advise the Committee to imitate the Council of the Zoological Society of London, and declare, that they do not "hold themselves responsible for the nomenclature, and opinions expressed in this publication," i. e. the catalogue. *(Dr. M'Clelland's note.)*

† The proof of the very unusual "fly leaf" alluded to, and which contained a glowing panegyric *on the Bishop's College printing Press*, was never sent to the Secretaries for inspection.—Eds.

ral History from the Museum. Why, it was only at the last meeting of the British Association, that Dr. Buckland announced the intention of Messrs. Hutton and Henslow to continue the fossil flora of Great Britain, and of their requiring "the *loan* of specimens from the Geological Society, which would be carefully returned after drawings had been made of them."

10. Again, the Committee require that all correspondence connected with the Museum should pass through the Secretaries office, "in conformity with the practice of all similar institutions." Here the Committee no doubt evince the same intimate knowledge of the practice of other institutions, as in the instances already referred to.

It does not appear to have occurred to the Committee, that the Curator being a naturalist, can have little correspondence not connected with the Museum, so that to comply with this rule, he should require his friends to address him through the Secretary.

11. The Committee say, "our collection of minerals is an utter chaos," a statement which is not the fact, for they are all arranged; a Committee that would lay down rules for the direction of a Curator ought to know the difference between minerals and rocks. "Though rich," say this Committee, in "*anonymous* specimens valuable in themselves as illustrations of *abstract* mineralogy, but devoid of interest in a geological or geographical light, owing to the neglect with which they have been treated, &c." We can easily understand that the Committee may have been ignorant of the names of many minerals in the collection, especially as they do not seem to know the difference between minerals and rocks, but it does not follow that such minerals are "*anonymous*;" in fact the use of the term, as the Committee have applied it, evinces a total want of information on the subject; a mineral is not *anonymous* because it is without a label, any more than a man would be so when without a card in his pocket, with his name written on it. A person acquainted with either minerals or men will always know them whether labelled or not.* Yet this is the Committee who are ready to take the management of the Museum into their own hands, and as they say themselves, examine the claims of such candidates as may offer for the Curatorship within a period of three months.

12. "It appears," they say, "that the first object of the Society in remodelling the Museum, should be to form a grand collection of minerals and fossils, illustrative of the geology, geography, and palæontology of our British Indian possessions." This sounds well, but we are at a loss to know how *minerals* and *fossils* could illustrate *geography*, and had always supposed that palæontology was merely a branch of geology; but perhaps the Committee intend to remodel the Sciences as well as the Museum. "A few *existing* minerals" (could there be any other kind)? This is the report of a Committee of Papers of a learned Society, claiming an authority quite unprecedented over the labours of others, it is therefore of importance before their claims be sanctioned, to see how far the scientific character of the Society would be safe in their hands) "and some superb fossils in our Museum are available for this

* This passage is quite explanatory of the views on which the writer acts, and of those by which the Committee of Papers are led.—As Dr. M'Clelland knows every mineral a glance, he thinks that quite sufficient. The Committee desire the novice to be supplied with the means of acquiring a little of their Curator's knowledge. As to the quibble regarding rocks and minerals, if Dr. M'Clelland knew the difference between a class and an order, he would be aware that every rock is a mineral, though every mineral is not a rock.—Eds.

object," i. e. for making a grand collection, but as the things in question are already in the Museum, they are not merely "*available*" for the object in view, but constitute so much of the object itself already accomplished.

13. The Committee continue, "while waiting for these additions to our collection, he," the Curator, "should proceed to label these already in our possession." It is within the recollection of the Society, that I stated eight months ago, that I could do nothing with the geological collection until cabinets were first provided: these were accordingly sanctioned by the Society, but ordered by the Secretary from a native for less than he could afford to provide them for, the consequence is, that they still remain unfinished.* This is an instance of the ill effects of leaving the Curator dependant on the Secretary, or any one else, for things on which his own work depends; and as the circumstance is brought forward rather unfairly in the report of the Committee, I must be permitted to say, that had any member of that body required an *easy chair*, we may presume he would have obtained it at once, from the best cabinet maker, cost what it might.

14. There is but one name attached to the report which can be at all held responsible in a scientific point of view for the sentiments embodied in it, and although Dr. WALLICH may fairly be exonerated as any great authority on the subject of Museums, yet his own experience ought to have suggested the difficulty of making monthly reports on subjects connected with Natural History, he himself finding a single report too much to accomplish in the five years, that have now elapsed since his return from Assam.

15. From what has taken place on this subject, I have been induced to refer to the rules of various Societies and Museums, in hopes of finding some rules laid down for the duties of Curators. You will doubtless be very much surprised to learn, that though in all cases the duties of Presidents, Vice-Presidents, and Secretaries are strictly laid down in bye-laws, yet Curators alone appear to be the only officers who are left altogether to conduct their duties according to the best of their judgment and acquirements. Were they not the chief authority in all things on which the advancement, arrangement, and preservation of collections of Natural History depend, how could they be held responsible for their charge?

16. The antiquities may be safely left, as far as their "preservation" is concerned, to the "honorary services of the oriental secretary, the librarian, and pundits," but the natural history and geological departments must be left to a naturalist and geologist, for whose services the Society can have no security beyond his own reputation. Nothing could show the necessity of this more than the present attempt to reduce the Curator from that honorable and independent station which he fills in civilized countries, to a state of dependence on the caprice of Committees.

I have the honor to be,
Gentlemen,
Your most obedient servant,
J. M'CLELLAND.

28th Feb. 1840.

* Here Dr. M'Clelland is in ignorance of the facts, and consequently makes erroneous statements.—EDS.

The reading of Dr. M'Clelland's letter occasioned much amusement, and called forth some very pointed remarks from the President, Sir Edward Ryan; the Honorable Messrs. H. T. Prinsep and Wilberforce Bird; Mr. Torrens, and others. Messrs. Curnin and Bagshaw suggested that the consideration of the Report be postponed to the next Meeting, but both these gentlemen at the same time disclaimed any defence of the terms and tone of Dr. M'Clelland's letter.

It was than moved by Mr. Bird, seconded by Mr. Piddington, and carried with but *two* dissentient voices, that the report be adopted, and that the Committee of Papers be empowered to act on the views it contains.*

* We are in possession of accurate reports of the observations made by the speakers on this occasion. We refrain from their insertion from motives which, in all probability, will be thoroughly mistaken by Dr. M'Clelland and his friends.—EDS.

Index.

Page.

Aerolite, presented to the Society, Note on an 822
Affghanistan, Objects of research in 146
Affghanistan and the Neighbouring Countries, Memoir on the Climate, Soil, Produce and Husbandary of 745, 779, 869, 1005
Alexander the Great's exploits on the Western Banks of the Indus, 304
Arctonix Collaris, or Sand Hog, Note on the dissection of the 408
Arsenical Poisons, On the detection of 447
Assam, Extracts from the Narrative of an expedition into the Naga territory of 445
Astronomical Instrument, presented by Ram Sing of Khota, to the Government of India, Description of an 831
Azimghur, Report on the settlement of the ceded District of 77
Birds, Distribution of European .. 21
Birds, Two new species of Meruline 37
Bora Chung, or Ground Fish of Bootan, Note on the 551
Burke's, Dr., Report on the value of Life among H. M's. troops in India, ... 48
Burmese Drama, translated by J. Smith, Esq., Specimen of the 535
Camel Draught to Carriages, Documents relative to the application of 591
Camel Litters for the Wounded, Note on 702
Coal and Iron Mines of Tálcheer and Ungool, &c. &c., Report on the .. 137
Coal Field of Tenasserim, Papers relative to the New 385
Coel, and on the discovery of Isinglass, Note on the habits of the .. 684
Copper Mine in Kumaon, Report on the progress made up to the 1st May 1839, in opening the experimental 471
Extracts from the Mohit (the ocean) a Turkish work on Navigation in the Indian seas, ... 823
Fissirostral Tribe, A new genus of the 35
Fossil Shells found in the Saugor and Nerbudda territories, Fifteen varieties of 708
Fossil Sites, on the Nerbudda, Note on various ...? 950
Gale and Hurricane in the Bay of Bengal on the 3rd, 4th, and 5th of June 1839, Researches on the 559, 631

Page.

Geographic distribution of the Vulturidæ, Falconidæ, and Strigidæ, 321
Geology, &c., of the country between Bhar and Simla, Remarks on the 1037
Gold Dust and Diamonds at Heera Khoond, Note on the process of washing for the 1057
Grammar of the Pashtoo, or Affghanee language, A 1
Grant engraved on Copper, found at Kumbhi in the Saugor Territory, Notice of a 481
Gunpowder under water, by the Galvanic Battery, Memorandum on the Explosion of 851
Hatching, Egyptian system of Artificial 38
Hindoos, Statistical record of the duration of diseases in 13,019 fatal cases in 316
Hindoo Females, Note by Dr. Kean of Moorshedabad, on Dr. Stewart's Table of Mortality among 704
Hodgson, Mr., on Cuculus, ... 136
Indian Cyprinidæ, Extracts from the As. Res. vol. xix. Part ii. on 650
Indian Hemp or Gunjah, Extract from a Memoir on the preparations of the 732, 829
Iron ore of the district of Burdwan, Note on the smelting of the 683
Isinglass in *Polynemus sele*, Buch., 203
Journey to Beylah, Account of a .. 184
Journal of the Mission which visited Bootan, in 1837-38, ... 208, 251
Journey from Calcutta to Sumbulpúr, and from thence to Mednipúr through the Forests of Orissa, Account of a 367, 474, 606, 671
Journal of a trip through Kunawur, Hungrung, and Spiti, undertaken in the year 1838, ... 901
Journal of a Mission from the Supreme Government of India to the Court of Siam.. 1016
Mahimnastava, or a Hymn to Shiva, The 355
March between Mhow and Saugor, 1839, ... 805
Mechis, together with a Small Vocabulary of the Language, Note on the 623
Medicine in Egypt, Memoir on the Regeneration and actual state of 393
Meteorological Table, 76, 158, 250, 346, 442, 443, 444, 621, 692, 777, 867, 971, ... 1069.

	Page.
Middleton, Mr., on the Meteors of August 10th, 1839, ...	495
Musk *(Mochus)* inhabiting the Himalayan districts, On three new species of	202
Museum of the As. Soc., Report on the	241
Museum of the As. Soc., Memoranda on the	415
Museum of the As. Soc.," Observations on the " Report on the..	419
Nizamut Palace of Moorshedabad, Extracts from the official records, with descriptive details regarding the New	552
Notice of an Inscription on a Slab discovered in Bundelkhund, ...	159
Notice of Inscriptions in Behar, ..	347
Notices, ...	866
Oils of Jasmine and Bela, Note to the Editors on the Native mode of preparing the perfumed	496
Otter, Summary description of four new species of..	319
Pillar found in the Ganges near Pubna, and of another at Kurra near Allahabad, Note on a	681
Plates of Hindu Architectural remains, Proposed publication of ..	384
Prefatory Notice, ...	i
Proceedings of the Asiatic Society, 72, 150, 245, 341, 429, 432, 433, 526, 687, 863, 953, ...	1059
Rain and Drought of the last Eight seasons in India, Remarks upon the	31
River Goomtee, Note on the	71
Roses and the Manufacture of Rose-water and Uttur at Ghazeepore, On the Cultivation of	41
Sanscrit Inscription on the Slab removed from above the Kothoutiya gate of the Fort Rohtas, ...	69
Scapes of Xanthorhæa and Fossil Stems of Lapidodendra, Note on	68
Sisupala Badha, or death of Sisupala by Mágha, ...	1
Tamba Patra Plates dug up at Baroda, in Goojrat, Account of	29
Tea, and on the extent and produce of the Tea Plantations in Assam, Report on the Manufacture of....	49
Telegraph Signals by induced Electricity, Memorandum relative to experiments on the communication of	71
Tenasserim—the surrounding Nations—Inhabitants, Natives and Foriegners—Character, Morals, and Religion, Third Report on ..	97
Trochilus and Crocodile of Hesse lotus, Note on the	59
Varnish Tree, Observations on the Burmese and Munipoor	7
Wells, &c. in Foundations ; as practised by the Natives of the Northern Doab, On the use of	32